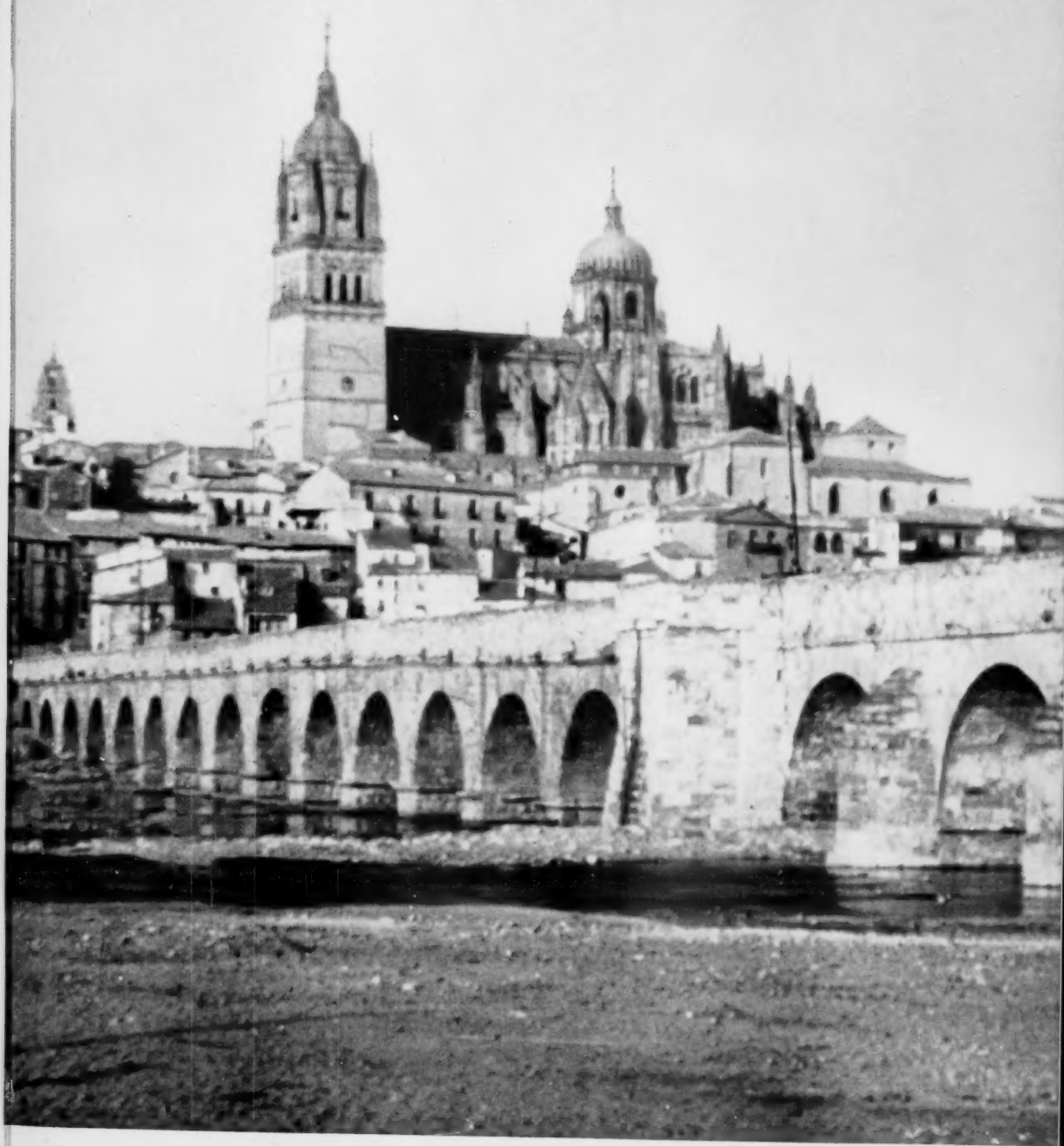


# ARCHAEOLOGY

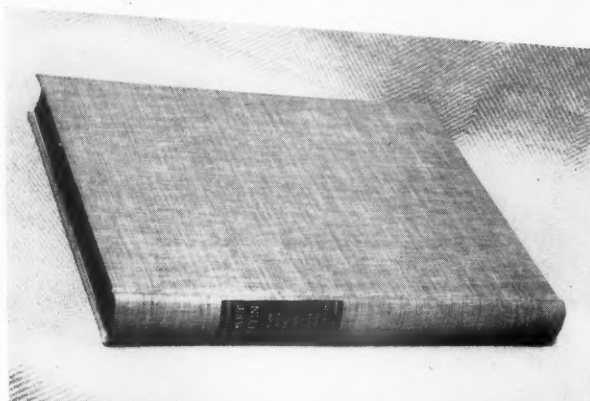


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# ARCHAEOLOGY

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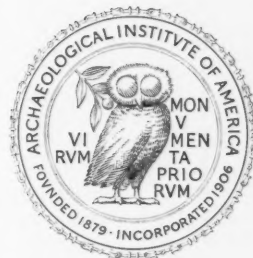
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## EDITORIAL

FOUR YEARS AGO THE ARCHAEOLOGICAL INSTITUTE OF AMERICA set out to demonstrate, by means of a new periodical, the truth of the phrase which every archaeologist has heard—so often that it has become a joke in the profession:

"It must be fascinating." Trite though the expression may be, it is none the less true. Archaeology *is* one of the most fascinating of studies, as this magazine in its first four years has consistently been proving.

The first Editor of *ARCHAEOLOGY*, to whose initiative is owed its very existence, has brought to these pages reports of discoveries in almost every part of the world, has secured the most interesting and provocative discussions of objects in museum collections, and has placed before us, in words and pictures, the most vital and up-to-date archaeological news. That he feels it necessary to pass on the task to others will be regretted by all who, in following the progress of this journal, have admired his energy, competence, and imagination.

In continuing his work we shall endeavor to hold to the standard he has set and, with the assistance of archaeologists everywhere, to present the reports of those whose business it is to explore the past and to disclose the achievements of our ancestors, physical and spiritual.

THE LIFE-BLOOD of archaeology is excavation, which, in turn, is fed by public interest. There was a time when sponsors of expeditions into foreign lands could count not only on increasing our knowledge but on bringing home some of the prizes they found. These days are now largely past, and as a consequence many institutions have come to feel that digging is not worth while if no tangible results can be exhibited at home.

Too much emphasis has perhaps been placed on the material rewards of excavation. Helen is no more real to us because SCHLIEMANN brought to Berlin a collection of objects he found at Troy, nor is Tutankhamen less real because his tomb furniture remains in Egypt. Both these individuals have become intensely alive to us because their excavators made them so through verbal and pictorial reports.

And along with improvement in techniques of excavation, techniques of reporting have also been improving. Almost every expedition is now equipped to produce color photographs, which make the site and the finds a hundred times more vivid to the stay-at-home than drawings and black-and-white photography ever could. New methods of making casts and reproductions can almost bring us the objects themselves. In addition to this, many excavators have recently come to realize that it is essential to make their discoveries intelligible to the layman as well as to their fellow experts. There is indeed much to be gained for everyone by excavation, even though not a single object may leave the territory where it has been found.

*ARCHAEOLOGY* attempts to bridge the gap between the scholar and the public. It provides an ideal outlet not only for excavators but for museum curators, whose "excavations" often prove as fruitful as those in the field. It is our earnest hope that, with their cooperation, we shall continue to present in this magazine the newest discoveries, long before there is time for them to be published in extensively annotated books and articles. As yet there is small possibility of extensive illustration in color, but with our readers' encouragement and an increase in their numbers, this too will be possible.

. . . along the *Via Augusta* and the *Camino de la Plata* . . .



Fig. 1. Arch of Bara. The *Via Augusta* passed beneath it; the modern highway splits just long enough to go around it

## MONUMENTS OF ROMAN SPAIN

By Albert H. Travis

*An Angeleno, Albert Travis is a graduate of the University of Southern California (B.A., 1936) and of Harvard (M.A., 1936; Ph.D., 1940). During the war he was on active duty, USNR, 1942-45, leaving the service with the rank of lieutenant commander. He has taught at Harvard, 1940-42, as Instructor in Classics, and at the University of Southern California, 1946-47, as Assistant Professor of Greek and Latin. Since 1947 he has been Assistant Professor of the Classics at the University of California at Los Angeles. In 1950, during the course of a sabbatical leave, Dr. Travis visited and photographed many sites of archaeological interest in Spain.*

**I**N 24 B.C., AFTER TWO YEARS OF CAMPAIGNS IN northwestern Spain, Augustus returned to Rome and closed the Temple of Janus. This act proved somewhat premature, but in 19 B.C. the last efforts at resistance on the part of the Spaniards were brought to an end. The entire Iberian peninsula was now in Roman

hands and was to enjoy at last an era of tranquillity and prosperity.

For the next two hundred years Spain was to know the full benefits of the *Pax Romana*, and even in the third and fourth centuries she was less disturbed than any other province by the struggles which harassed the

empire. Her situation as a peninsula freed her from the nuisance of border conflict. The reforms of Augustus in provincial administration introduced for the first time under Roman rule an extended period of comparatively decent government. Roman culture and the Latin language, already strong in the older centers of influence, penetrated widely through the peninsula. Indeed, several of the most important Latin writers came from Spain: the two Senecas and Lucan from Cordova, Mar-



Fig. 2. "Tomb of the Scipios." On the east coast of Spain are remains of several such tombs in the form of a tower

tial from *Bilbilis*, Quintilian from Calahorra, Columella from Cadiz; and the emperors Trajan and Hadrian (probably also Theodosius I) were born there. Again, Spain's enormous mineral resources and her vigorous export trade brought her a high level of material prosperity. It is not surprising that such an era should be an era of building. The principate is, in fact, the great period of Roman Spain's architectural achievement, and it is to this period that the majority of the extant monuments belongs.

But behind the placid years of imperial Spain there lies a stormy phase of provincial history which inevitably makes itself felt in what is to be considered here. From early times the Ebro valley, the eastern coastal strip, and especially the southern coastal strip and the Guadalquivir valley had been the most prosperous regions of the peninsula and culturally its most advanced. So it was among the Iberians after their coming to

Spain. The rich south attracted the Phoenician traders of the seventh century, who founded stations at such points as Cadiz, Malaga and Adra. To this general area came the Greeks, beginning about 600, to establish *Emporion* (San Martin de Ampurias), *Hemeroskopion* (Denia), *Mainake* (near Malaga), and other settlements. And it was over the Guadalquivir valley and the southern coastal strip that Carthage swiftly extended her influence when, in the latter part of the sixth century, she achieved her ascendancy in the southwestern Mediterranean. In the latter half of the third century, after the First Punic War, the Carthaginians began a systematic expansion which, despite Roman apprehensions, carried their sphere of influence up the east coast to the Ebro. In 219 B.C., his plans completed for war, Hannibal attacked Saguntum, an Iberian town allied with Rome, and precipitated the Second Punic War. In 218 the Roman general Gnaeus Scipio landed with his forces at Ampurias to attack Carthaginian Spain and by that act became the first to lead a Roman army into the peninsula.

After the defeat of Carthage in 201, Rome found herself in possession of the Spanish territory she had wrested from her enemy, and the Roman provincial period began. This territory consisted of a salient up the Ebro (*Hiberus*) valley, the eastern coastal strip, and the region composed of the southern coastal strip and the Guadalquivir (*Baetis*) valley. Two provinces were formed, *Hispania citerior* and *Hispania ulterior*, with the line of division lying somewhat south of Cartagena (*Carthago Nova*). The next one hundred and seventy-five years, during which Rome extended her rule from these slender provinces to the whole peninsula, contributed not a few grim pages to Roman history. In

Fig. 3. Roman theater at Saguntum seen from the top of the acropolis





Fig. 4. Puerta de Sevilla at Carmona, a monumental fragment of the Roman fortifications

ALWAYS ONE OF the principal factors in the security of their territory and in the spread of their culture was the excellent system of roads which the Romans built wherever they extended their influence. In Spain, the oldest of these seems to have been the one which ran from the Gallic border down the east coast. Whatever its earlier history, by the first century B.C. it was a Roman highway from the frontier as far as Cartagena and was called the *Via Herculea*, apparently from the myth of Hercules' driving off the cattle of Geryon. And whatever the Guadalquivir valley road may have been before the time of Augustus and whatever its tentative connections east of Cordova with the coast, it was evidently that emperor who linked it officially with the *Via Herculea* to create a complete Roman highway from the Pyrenees to Cadiz (*Gades*). From him this road, the foremost in Spain, took the name by which it was known in the Empire, the *Via Augusta*. Merida, founded in 25 B.C. by Augustus, became the capital of Lusitania and in due time the hub of an important system of roads. The chief of these led north to Astorga (*Asturica Augusta*). The Moors used it and are thought by some to have given it, because of its beauty, the name by which it became known to the Spaniards, the *Camino de la Plata*. Such highways as the *Via Augusta* and the *Camino de la Plata* passed through flourishing centers of Roman culture and, if followed today, lead the visitor to some of Spain's most impressive Roman remains. Traveling by automobile, we find that the modern highway is sometimes laid on top of the ancient road and that it is rarely at much distance from it. In what follows, I shall describe briefly a number of the monuments which one may visit

spite of certain exceptional administrators and commanders, the record of Roman activity in Spain under the Republic is all too heavy with misgovernment, treachery, and incompetence. In payment for this, during her long struggle with the sensitive and independent Spaniards, Rome had forced upon her lessons as costly as any she learned in her history of expansion. If Augustus brought peace and stable government to Italy after a hundred years of tumult, it was after twice that time that those blessings were, through him, conferred upon Spain. Under his principate, the administrative divisions of the peninsula were reorganized, and the map of Spain assumed the general complexion it was to have until the time of Caracalla. The territory was divided into three provinces, *Hispania Tarraconensis*, *Hispania Baetica*, and *Lusitania*, with capitals at Tarragona (*Tarraco*), Cordova (*Corduba*), and Merida (*Emerita Augusta*) respectively.

Fig. 5. Amphitheater at Italica, the largest in the peninsula. All Roman amphitheaters known in Spain are oval and placed outside or on the outskirts of town



simply by following the course of these two Roman highways, with a detour to Alcantara and a trip to Segovia at the end. We shall strike the *Via Augusta* in the region of Tarragona and continue on it as far as Seville (*Hispalis*), leaving it at that point for the Roman road which led northward through Italica to Merida. From Merida we shall follow the *Camino de la Plata*, with a detour to Alcantara, to Salamanca (*Salmanica*); from there we shall proceed east to the final point of call, Segovia.

Twenty kilometers northeast of Tarragona we come face to face with the Arch of Bara (FIGURE 1), an impressive reminder that in entering Spain we have entered a Roman province. Considered the finest in Spain, the arch was erected in accordance with the testament of Lucius Licinius Sura, one of Trajan's generals, and dedicated to his memory. Made of local reddish stone and standing 12.28 meters high, it is simple in design and ornament. The piers are solid; there is no attic. On either face, four fluted Corinthian pilasters rise from a base to support the entablature.

Five or six kilometers before we reach Tarragona, the "Tomb of the Scipios" (FIGURE 2) rises to the right of the road. Legend has created popular names for many monuments of Roman Spain. In this case, the Roman generals Publius and Gnaeus Scipio, who met their death in Spain in the Second Punic War, may have been suggested by the two figures in relief on the front of the tomb. Actually, these figures wear the native dress and may represent Spanish slaves or retainers. A weathered inscription seems to yield the name Cornelia.

The modern highway enters Tarragona close to the site of the original Iberian settlement, which was the region first occupied by the Romans. Almost from



Fig. 6. Mosaic floor, Italica



Fig. 7. Section of mosaic floor, Italica

the main road we can see one side of the rectangular mass which constitutes what remains of the *praetorium consulare*, the once extensive building from which the military affairs of the province were administered. The structure, though hardly beautiful today, is sturdy enough to be used as a prison. Again legend has been at work: "Palace of Augustus" and "Tower of Pilate" are its popular names.

The site of the original town is still largely surrounded by its ancient walls. Gnaeus Scipio, after landing at Ampurias in 218 B.C., proceeded in the same year against Tarragona, which had probably become a Punic base, and, after capturing it, restored its fortifications. The walls seem to be the result of this undertaking and therefore represent some of the oldest Roman construction in Spain. Roman Tarragona was eventually to spread far beyond these fortifications and to become one of the important cities of the empire. Julius Caesar conferred colonial status upon it, and Augustus, recuperating from an illness contracted during his campaigns in the northwest, wintered here in 26/25 B.C. As chief city of its province, it gave its name to *Hispania Tarraconensis*.

FOLLOWING THE *Via Augusta* south from Tarragona, we come to historic Saguntum. It was Hannibal's attack on this ally of Rome that brought Roman forces to Spain for the first time. Iberian Saguntum centered characteristically in a heavily fortified acropolis,

but the Roman town developed in the plain at its foot and extended toward the sea, then only three-quarters of a mile away. The base of the acropolis was utilized to support the auditorium of the Roman theater (FIGURE 3), today one of the best preserved in the peninsula. In design it subscribes to the usual Roman pattern, having a semicircular *cavea* connected physically with the *scaena*.

The *Via Augusta*, leaving the coast at Cartagena and passing through the mountains to the upper Guadalquivir valley, leads in due course to Cordova, in Roman days the capital of *Hispania Baetica*. Upon arriving at Carmona (*Carmona*) beyond Cordova, the hunter of Roman monuments will pass through the town to the structure called the "Seville Gate" (FIGURE 4), a part of the ancient fortifications. This consists of a roofless, walled-in chamber with massive gates in the outer and inner walls. To make his way into the city at this point, the enemy was obliged to force two gates; and after forcing the outer, he found himself in an enclosure



Fig. 9. Detail of Roman material from the Temple of Mars, reused in the shrine to St. Eulalia, Merida

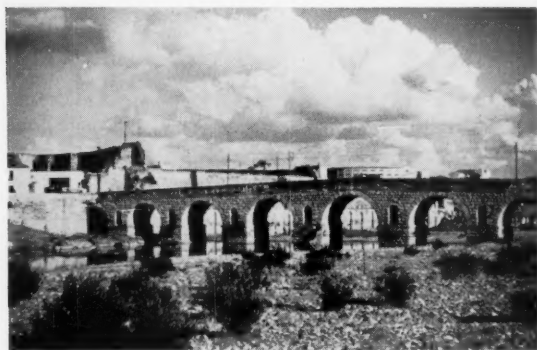


Fig. 8. Section of great Roman bridge over the Guadiana at Merida. The apertures in the piers were designed to allow a freer flow of water at times of flood

which made him highly vulnerable to attack from defenders on the walls above. Part of the chamber wall may date from the Second Punic War, thus being very old for Roman construction in Spain; the rest of the work perhaps belongs to the time of Trajan, with the exception of some reconstruction of the inner gate by the Moors. But even in Julius Caesar's time the city was heavily fortified. In the *Civil War* (II.19.4) he describes Carmona as *longe firmissima totius provinciae civitas*.

At Seville, where some remains of the Roman walls and of an aqueduct may be seen, we leave the *Via Augusta*, which goes south to Cadiz, and proceed north-

ward a few kilometers to Italica, which lies on the Roman road linking Seville with Merida. Italica was founded in 205 B.C. by Scipio Africanus for his veterans and thus gained the distinction of being the earliest Roman town in Spain. At first apparently a frontier fortress, it became under the principate a thriving city. The emperor Trajan was born here, and probably Hadrian also. During the Middle Ages the builders of Seville used it as a quarry and, although the foundations of various public and private structures can be traced, the only monument of which there are extensive remains is the amphitheater (FIGURE 5). With over-all dimensions of 156.50 by 134 meters, it is the fourth largest known in the Roman world, the Flavian amphitheater at Rome and those at Pozzuoli and Capua alone being bigger. Of the several remains of such structures in Spain, this and the one at Merida are the best preserved. The substructure of the arena is of considerable interest; here the piers which supported the wooden floor above the *fossa bestiarum* may still be seen. Without real evidence this amphitheater is sometimes said to date from Trajan's reign; an inscription of the time of M. Aurelius and L. Verus show it was constructed before 169 A.D.

ALTHOUGH THE ROOFS and walls of Italica's buildings are gone, their floors in many instances are not. The fact that the brilliant mosaic work which constitutes many of these lies unshaded by roof or wall provides the amateur color photographer with an irresistible opportunity. As in much of the Roman Imperial world, mosaic floors were popular throughout Spain, and those at Italica serve as good examples. FIGURE 6 is geometric in conception, the basic pattern con-



Fig. 10. Central portion of the scaena of the theater at Merida. The shafts of the columns are of bluish marble; the bases, capitals, and entablatures of white

sisting of lozenges forming eight-pointed stars and of squares. The face of FIGURE 7 occupies a circle framed in an octagon, which gives rise to an elaborate system of patterns in the subordinate elements surrounding it.

In 25 B.C. Augustus founded Merida to reward the veterans of the Fifth and Tenth Legions for their services in the Cantabrian war. The pet of the emperor and of Agrippa, almost overnight it became one of Spain's most sumptuous cities in public buildings and is today, of all sites in the peninsula, the richest in Roman remains.

In approaching the town from the south, one crosses

the Guadiana (*Anas*) river on the peninsula's longest Roman bridge; it is 792 meters (almost exactly one-half mile) in length and contains some sixty arches. This vital structure, built probably at the time of Augustus, has undergone much reconstruction through the centuries. The best preserved section of Roman work is represented by the first eight arches on the city side (FIGURE 8).

In 1617, four pilasters, two columns, and a section of entablature from a Roman temple of Mars, the site of which is unknown, were employed in building the portico of the little shrine which marks the spot where, according to tradition, St. Eulalia was martyred (FIGURE 9). The monolithic marble columns and pilasters have been shortened. The entablature, which contains some particularly fine decorative work, still has the original pagan inscription, said to date from Nero's time: MARTI SACRVM / VETTILLA PACVLI (dedicated to Mars by Vettilla wife of Paculus); but the alarm of the pious is allayed by a later inscription which declares that the edifice is no longer consecrated to the god of war but to Christ and His bride Eulalia.

EXCAVATIONS IN THE theater at Merida have yielded some of the richest finds from any Roman theater. At an unknown date the structure was largely filled with a deposit of earth which, like the ash at Pompeii, protected much that would otherwise have been lost. It is in the area of the *scaena* (FIGURE 10) that the most unusual remains are to be seen. The lower structural



Fig. 11. Section of the aqueduct at Merida called Los Milagros

elements of the *scaena* itself were preserved intact, with the result that it has been possible to rebuild the walls accurately as high as the first order of the *scaenae frons*. Moreover, the earth preserved to a remarkable extent the fine columns and entablatures which had decorated the face of the *scaena*, and in the lower order these have



Fig. 12. Bridge over the Tajo near Alcantara. It is constructed entirely of granite blocks

been returned to their place, together with statuary which stood on bases between the columns. A considerable number of the columns of the second order have also been recovered, but this element has not been reconstructed. Inscriptions make it possible to date the completion of the original construction of the theater to 18 B.C., but the *scaena* owes the greater part of its present aspect to reconstructions of the time of Trajan and Hadrian.

Three aqueducts brought water to Merida. Of two only traces remain; but of the third, popularly called "The Miracles" (Los Milagros) because of the seemingly impossible equilibrium of some of the ruined piers, imposing remnants stand. There now exist thirty-eight piers in various states of preservation, less than half the original number. The section shown in FIGURE 11 suggests the proportions of the work. Here only the topmost arches are preserved, but the nubs of those of two lower tiers may be made out. Originally, the lofty, slender, close-set piers linked by three levels of arches must have produced an effect of monumental grace. The core of the piers is concrete; the facing consists of alternate courses of five granite blocks and five bricks. The maximum height is 25 meters.

From Merida we go northward on the *Camino de la*

Plata by crossing the Albarregas river just above the city on a small Roman bridge. At Caceres (*Norba*), where the mediaeval fortifications contain vestiges of the original Roman construction, the detour to Alcantara begins. Near that town, the name of which in Arabic means "the bridge," there stands the magnificent structure (FIGURE 12) which conveyed over the Tajo (*Tagus*) river the Roman highway that apparently went to Coimbra (*Conimbriga*), Portugal. The six arches of this tremendous bridge support a section of the road 194 meters long; but the strength of the work is most fully revealed by the height of the central pier, which rises 48 meters from the riverbed. In the center of the bridge is an honorific arch which, as an inscription states, was erected and dedicated to the emperor Trajan upon the completion of the bridge about 105 A.D. Another inscription on the arch lists the several towns of Lusitania which contributed to the fund that financed the construction of the bridge.

Near the head of the bridge on the left bank of the river stands a little temple in an almost perfect state of preservation (FIGURE 13). Like the bridge and arch,



Fig. 13. Small temple near the great bridge at Alcantara shown in figure 12. There are two Tuscan columns in antis. The interior (5.66 meters long) is divided into pronaos and naos. An inscription, now lost, preserved the name of the bridge architect

it is constructed of granite blocks. The original inscription over the door, fortunately recorded by the humanists of the sixteenth century, not only revealed that the temple was consecrated to Trajan, but preserved from oblivion the name of a man of some talent, C. Julius Lacer, the architect of the bridge.

All the illustrations for this article are from photographs made by the author

RETURNING FROM ALCANTARA, crossing the Tajo on the way northward, we can see upstream the four remaining arches of the great bridge which carried the *Camino de la Plata* over the river almost at the point where the Almonte empties into it. Between the Tajo and Salamanca the Roman highway passed through the town of *Capera*, now an uninhabited site called Ca-



Fig. 14. Arch at Capera. Other examples of this rare type are the arches of Janus Quadrifons in Rome, of Caracalla in Tebessa, and of M. Aurelius in Tripoli

parro. The modern road is several kilometers distant, touching the village of Oliva. Although the foundations of other structures may be traced, the only monument standing is an arch of unusual form (FIGURE 14), erected by one M. Fidius Macer in accordance with the testament of his parents. Its sides form a rectangle measuring 8.59 by 7.35 meters. Four piers set at the corners support four arches, the interior being covered by a cross-vault. This arch is unique in Spain, and represents a type of which few examples are known elsewhere in the Roman world. It must have stood near the center of town, perhaps actually over the intersection of the two main streets. Near the site of *Capera* a Roman bridge of four arches, in use today, spans the Ambroz river.

From *Capera* the *Camino de la Plata* leads to Salamanca, a striking sight as it rises beyond the Tormes river. To reach the city one crosses the river on a massive bridge of Roman origin (COVER). The ancient construction is well preserved in the fifteen arches nearer the city; the remaining twelve were constructed

less than three centuries ago, in 1677.

At Salamanca we leave the *Camino de la Plata* and travel eastward to see a monument that can be omitted from no visit to Roman Spain. The aqueduct of Segovia, which was first a considerable Iberian town and later an important Roman city, brought water about sixteen kilometers to a reservoir on a hill above the town; from this point a great bridge of masonry carried the water first along the upper slope of the hill on a single tier of arches and then, changing direction in an obtuse angle, across a valley on two tiers. The most effective detail of the whole is composed of the four central arches of this latter section (FIGURE 15). Here the structure, strong but graceful, rises to a height of 28.50 meters. The attic bore an inscription, now lost; the work may be dated, however, to about the time of Augustus. The statue in the niche is that of the Virgin Mary; modern Spain lives close to the monuments of its Roman past.



Fig. 15. Aqueduct of Segovia, central arches. The figure is that of the Virgin Mary. A similar niche on the other side contains a statue of St. Sebastian

THE COVER: Salamanca and the Roman bridge over the Tormes. The part of the bridge nearer the city is ancient, and the section in the foreground is seventeenth century Spanish construction.

# ART OF THE MING DYNASTY

By Paul L. Grigaut

*Associate Curator, The Detroit Institute of Arts*

**A**FTER A LONG PERIOD OF INDIFFERENCE AND DIS-  
trust the art of the Ming Dynasty (1368-  
1644) has been in recent years the object of  
scattered study in this country and in Europe. A few  
enthusiastic articles, a number of carefully prepared  
exhibitions have done much to place certain aspects of  
Ming art before the public. Yet, restricted to one phase  
of activity or to one medium, these articles and exhibi-  
tions have attracted principally specialists or open-  
minded collectors. Compared to the vogue enjoyed at  
the present time by the achievements of earlier periods,  
the arts of the Ming Dynasty are considered in many

circles flamboyant, derivative, and obvious. They are  
damned with faint praise, or else just damned, and  
their champions are usually suspected of an unfortu-  
nate lack of taste. As one of the most respected and  
feared connoisseurs of Chinese art (who proved to be  
one of the most helpful and willing advisors of the  
current Detroit exhibition of Ming art) put it recently,  
"The Ming period is a bastard epoch of great confu-  
sion and disorder, reflecting a great many foreign in-  
fluences, not too happily."

Are these accusations of "lifeless imitation," "timid  
conservatism," "exclusive seeking after the pretty"—  
to choose at random a few epithets used to describe  
Ming art—justified? To find an answer to this question  
The Detroit Institute of Arts has planned what is prob-  
ably the first exhibition entirely devoted to the arts of  
the "Radiant Dynasty." Its organizers had a double  
purpose: to recreate as far as possible the "climate" of  
the Ming period, both at the Imperial Court and in the  
cultured circles of the Chinese middle class, and to re-  
habilitate further what they consider, with a few quali-  
fications, a splendid and dynamic moment of art.

To accomplish this pleasant and dangerous task the

*In recent years several exhibitions have called attention  
to Ming art. Among them were: Kansas City, 1946 (Paint-  
ing); Los Angeles, 1948 (Chinese Paintings); New York,  
1949 (Great Chinese Painters of the Ming and Ch'ing  
Dynasties); Philadelphia and Chicago, 1949-50 (Ming  
Blue-and-White); New York, 1951 (Imperial Wares of  
The Ming Dynasty). In England the exhibitions of the  
Oriental Ceramic Society (Monochromes; Blue-and-White  
Porcelains) have also attracted a great deal of attention, and  
the British quarterly, Oriental Art, has been often a strong  
champion of Ming art.*

## Rocks

A variation on the theme of bizarre rocks and withered  
trees dear to the Chinese landscape designers. Of polished  
wood, about 18 inches high, this carving has been loaned to  
The Detroit Institute of Arts by Dr. MAX LOEHR, of Ann  
Arbor, Michigan.





Photo: ROMA

organizers of the exhibition borrowed from all available sources—museums, collectors, dealers—and enlisted the help of many scholars. The results of this co-operative undertaking have been most satisfactory.

#### Winter Landscape, by Lan Ying (1578?—after 1660)

This is a detail—about one-third of the scroll—from a painting in the Seattle Museum by the last representative of the Ch'ekiang school. A delightful work in its own right, its importance is further enhanced by a long inscription in Lan Ying's handwriting dedicating it to his friend Chi-ho, the Governor of Shang-si province. The inscription reads:

"If Chi-ho, my senior in literary pursuits, is not occupied in his research of the Six Classics, he is absorbed in the study of the Six Canons, which forms the background of the art of painting and calligraphy. Once when I returned from a trip to Pei-yüeh mountains, Chi-ho came to my house. As the

#### Architectural ornament Yen Lo—The Decider of Life in Hades

This large (33 inches high) and colorful figure of hard buff stoneware with green, yellow, and tan glazes is an impressive monument of Ming sculpture. Characters incised on the rear of the base before firing read, "made by Ma Shih," while characters in ink (which of course may have been written at any time) read, "second year of Chia Ching [A.D. 1524]." It is on loan from the Royal Ontario Museum of Archaeology.

Some four hundred objects—paintings, ceramics, sculpture, jade, and textiles, as well as the *bibelots* for which the period is famous—have been brought together, to form an instructive and dazzling display. From this test the art of the Ming emperors emerges victorious, with its boldness and originality, perfection of craftsmanship and whimsicality, above all with a strength and splendor comparable only to the strength and splendor of the baroque art of Versailles.

TO VISITORS WITH patience the section devoted to painting will probably be the most rewarding. Forming what may be the largest exhibition of Ming painting assembled in this country, some sixty scrolls present the various facets of Ming brushmanship, one of the most subtle forms of art devised by man. Portraits are few—it seems that most ancestral portraits

rainy season started then, he was unable to leave for his home. While he was spending quiet days with me, he produced this paper and asked me to paint in the different manners of the four masters, Tung Yüan, Huang Kung-wang, Wang Meng and Wu Chen. In ten days I completed this picture. Now I beg Chi-ho to correct my imperfections. The work is unworthy to be placed before such a learned friend.

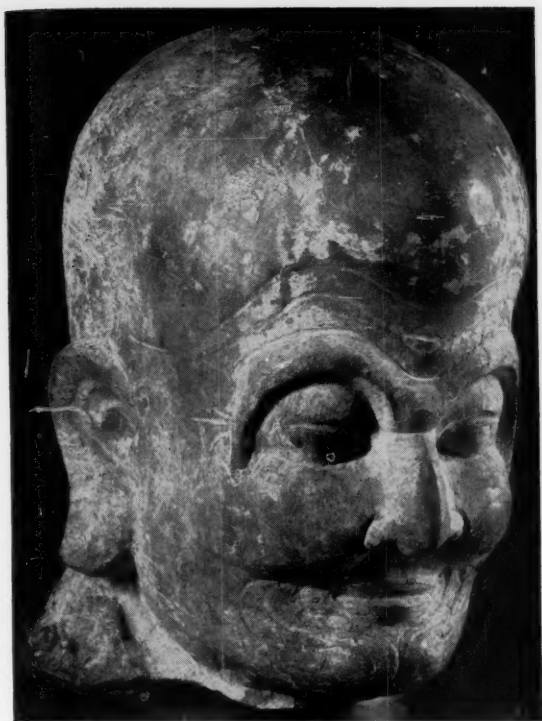
Done in the year of Chia-tzu [1624]

Your junior Lan Ying of Ch'ien-tang [Ts'ien-t'ang]"

The whole scroll is 21 feet long and 10½ inches high.

Photo: Seattle Art Museum





Head of a Lohan

Stone sculpture of the Ming period is often difficult to date, or even to recognize as belonging to the period. However, the realism of this head and the simplicity of the carving imply a Ming date. Of grayish stone, the head is virtually life size, about 8¼ inches high.

called Ming belong to later periods—but actual portraits are rare in Chinese painting of all periods. "Flower-and-bird" painting, one of the favorite themes of Chinese art, is also represented by few examples. The art of landscape, on the contrary, is fully represented, with a number of the important Ming paintings preserved in this country. Some are only ten or twelve feet long, many when spread open extend to twenty or thirty feet. Most of the great names of the period are represented, from Emperor Hsüan-tê himself (1398-1435) to the last representative of the Chêkiang school, who was still active when the last Ming emperor committed suicide. Most of the scrolls have long inscriptions by the artist, usually apologizing for their imperfections and unworthiness.

It was under the Ming Dynasty that porcelain and pottery manufacture reached the fame it still enjoys throughout the world. New decorative schemes, new

shapes were then developed, influencing the art of ceramics from Persia to Italy and France. The Detroit exhibition presents as varied a display of Ming porcelain as was possible to gather in this country. "Blue-and-white," which many consider the Ming porcelain *par excellence*, is represented both by famous and by unknown examples. The more gorgeous and striking *San-ts'ai* wares, the "Ming for millionaires" as Hobson called them, are also well represented, with well known examples borrowed from the Cleveland Museum and from private collectors.

More impressive still is the extraordinary display of immense roof ornaments, which forms an entrance to the exhibition. The majority of these "roof tiles," some of which are almost life-size guardians of homes and temples, have been borrowed from the Royal Ontario Museum of Archaeology, which makes Toronto the Mecca of orientalists. No description can give an impression of the vigor and nobility of some of these figures: the War God from the Nelson Gallery with its simplification of masses, the "God of Hades" from Toronto, are among the masterpieces of Chinese sculpture of all time.

The minor arts are represented by a large number of bibelots shown with the respect due to their aesthetic qualities. In breadth of conception and emotive power the splendid group of books illustrated with woodcuts, owned by the New York Public Library, is a noble contribution of China to the graphic arts. The exhibition includes representative jades; a large part of the Low-Beer collection of Ming lacquer, one of the most impressive groups of its kind; and finally, a large number of sculptures in various media—stone, bronze, iron, the latter a favorite metal with Ming craftsmen. The famous seated official in gilded lacquer, one of the supreme achievements of Ming art in this country, has been lent by the Metropolitan Museum.

THE MING PERIOD is extremely complex. It is a period of pride in problems technically difficult to solve. Because of its very complexity, the art merits attention at a time of increasing appreciation for craftsmanship in all its forms.

The Ming period has been called one of copyists. The exhibition is designed to show that the so-called "copyists" were not blind imitators and that many works are intensely personal. Such paintings as Shen Shou's "Ode to a Pomegranate," such wares as the "Three Color" vases and jars, and the *kuei kung* bowls reveal what many will consider a phenomenon—a Ming style.

# WITH PICK AND SHOVEL IN PINE LAWN VALLEY

By Paul S. Martin

*Chief Curator, Department of Anthropology  
Chicago Natural History Museum*

PINE LAWN VALLEY, HUGGING THE ARIZONA border in west central New Mexico, has been the pleasant homeland of a few privileged men—at first Indians, and later whites. About 5000 years ago a band or two of Indians, “displaced persons” we call them, wandered into the Valley from farther south and west—from what is now called southeastern Arizona. We have dubbed these wanderers the *Cochise* Indians.



Were these Cochise people nomads, given to straying here and there; were they driven out by other stronger, predatory Indians; or were they filled with a desire to explore, to seek new lands, new fortunes? No; they were forced to depart from their home lands by the shrinking of the lake near which they and their ancestors had lived for several millenia. They may have dispersed in several directions; certainly a handful—perhaps a hundred or so—discovered Pine Lawn Valley. So far as we know, they were the first settlers of the Valley; and from their simple way of life grew a culture that lasted many centuries and that probably had important effects on neighboring peoples.

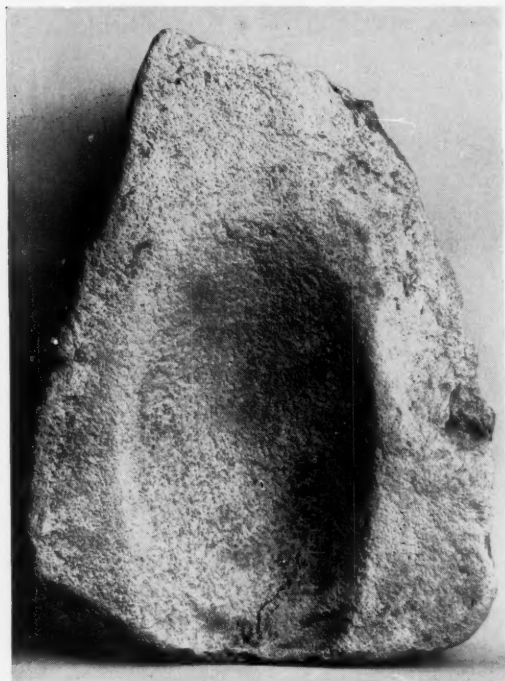
Once arrived, the Cochise people camped along the banks of a pleasant streamlet that issued from a spring high up in the nearby mountains. Living near a clear mountain stream must have been refreshing in many ways: water always at hand for domestic purposes and for sustaining many usable rushes and edible plants; water in quiet pools providing drinking places for deer, wild pig, bear, and other animals of the chase.

As the years and centuries sped on, life became, little by little, more complex, more “advanced.” From time immemorial men had surveyed the green lands around them and had learned that many plants—seeds, leaves, roots—could be eaten with no ill effects and were good. Food gathering and the necessary tools, such as crude milling stones, mortars and pestles, became accepted in their way of life; and thus wild plant foods were added to their restricted diet of meat.

But many thousands of miles to the south in what we now call South America, someone—one who will never receive a prize—had made the greatest American

Weathering has brought to light many artifacts of early cultures. Recent erosion in Wet Leggett Canyon stranded this metate on a small peak.

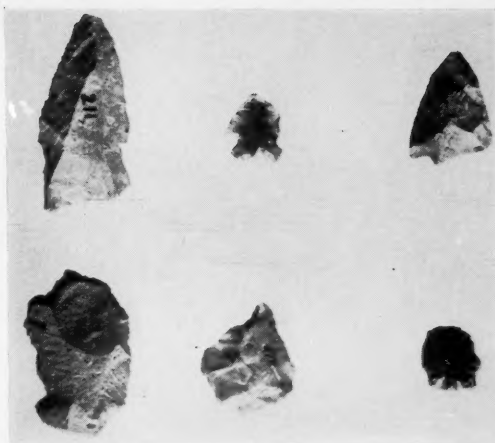
discovery to date. This unsung person found that certain seeds, if planted, cultivated, and watched over, would yield a sure crop; and that if a few seeds were carefully guarded against moisture and vermin, they could be planted a second year and would, if all nature smiled and cooperated, produce still another crop. Thus was maize created, from such lowly antecedents and perhaps by accident.



The metate, lower milling stone, indicates the agricultural nature of the Cochise Indians. Found in every household, they show the importance of seeds, nuts, and possibly maize as food items. This specimen dates from about 2500 B.C. and measures 47.4 centimeters in length.

AT ANY RATE, with less time expended on rooting about for wild food plants, leisure increased, and life became less tenuous, especially for the thrifty who put aside a cherished surplus of the blessed maize to tide themselves and family over a season if winds, clouds, drought, or excessive moisture conspired to stunt or kill the maize seedlings.

With leisure, man had a chance to develop arts and skills. With a fairly stable food supply assured, the



Stone tools are among the most frequent finds in early American cultures. Some typical Cochise examples, dating from 3000-1500 B.C., are shown here. The two on either side are blades and have, or once had, sharp cutting edges. The center object in the upper row, notched for hafting, is a projectile point; that below it, with a different kind of point, is an engraving tool.

population tended to increase. And with a larger population, the chances of producing an inventor or a genius now and then were increased.

These blessings—a dependable food supply from maize (and soon after, from beans and squash), leisure, and increased populations—were diffused, by what means we do not know, from South America to Pine Lawn Valley about 2,000 to 2,500 years ago.

From some other center of higher culture there came to the Pine Lawn people the knowledge that brush or skin shelters were passé, that one could live more comfortably in a pit-house—a neatly excavated hole, roundish, about sixteen feet in diameter, over which a roof of poles, brush, and sod could be constructed. Wind, rain, and snow could be excluded by attaching to the main covering of the house a long passage-entrance similar to those of Eskimo igloos.

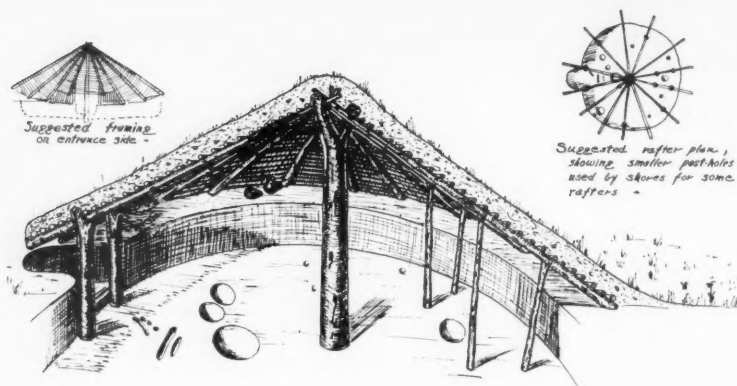
The art of molding, polishing, coloring, and firing selected clays into basket-like shapes—bowls and jars—was also borrowed from neighbors, perhaps from folk who lived to the south.

THUS, SHORTLY BEFORE THE beginning of the Christian era—about 100 B.C.—the Cochise culture had been greatly modified and augmented. The



From the Pine Lawn phase, 100 B.C.-A.D. 500, there are several large pit-houses. The excavation at pit-house J has reached a stage where shovels are set aside, and smaller, more delicate tools come into use in uncovering post-holes and burial pits. At the same time, the team of horses makes lighter work of clearing the debris. The stepped-down entrance appears at the left.

Below, theoretical restoration of roof and floor features in pit-house J.



changes are so pronounced and significant that archaeologists decided to mark this memorable time, this milepost of advance, by bestowing another name on the new cultural aggregate. The term *Mogollon* has been adopted, signifying the addition of houses and pottery-making to the older, basic Cochise traits—tools of stone used for treating wild foods and later for grinding corn to flour; corn, beans, squash, and other minor items. The term *Mogollon* connotes one of the longest, continuous cultural developments in North America with roots reaching back to post-Pluvial times, or about 7,000 years ago.

From about 100 B.C. onward, developments took place more rapidly in Pine Lawn Valley. We have been able to trace several periods—all marked by significant

changes in types of houses, in village sizes and their locations, in types of pottery and stone tools. Some of these periods we have investigated; others still await our shovels and picks. But some of the major patterns and outlines are beginning to emerge from the shadowy past.

The first period in which we find, in combination, pottery, houses, corn, beans, squash, as well as the familiar stone implements held over from the Cochise era, we call *Pine Lawn*. We date it from about 100 B.C. to A.D. 500. During this period the people began to accumulate more possessions and as a result

had to protect their homes, crops, and corn warehouses from looting enemies. A feeling of gregariousness overcame that of suspicion, and the people decided to live together in groups. They built villages containing from four to twenty pit-houses on high, narrow, defensible mesas. Each pit-house was probably occupied by one or two families related by blood or marriage. This last is an assumption, but it is based on several facts.

The houses of the Pine Lawn period were larger than those in any other time-period under consideration. Under conditions existing in a primitive society, more people could have occupied some of these large houses, many of which yielded more than the one essential metate and many stone tools. We guess that

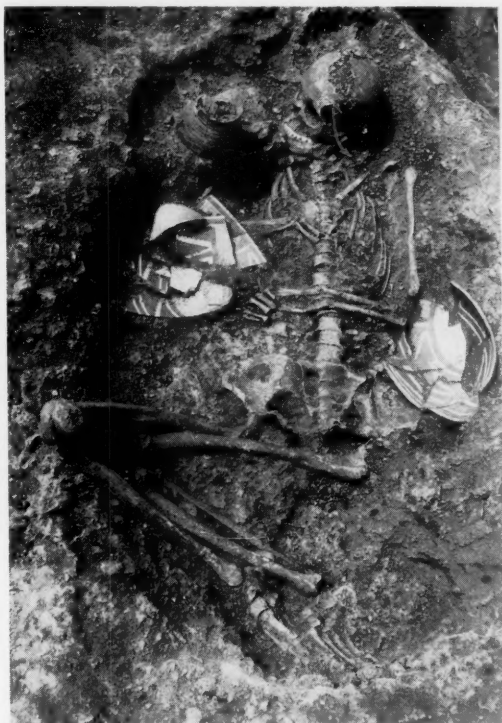
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these facts may be interpreted to mean that several families may have occupied one house. We further guess that, since social organization has "drift" similar to that in linguistics, once started on a certain path, social organization will tend to follow along in the same general direction. Since the Cochise people may have traced descent by mother-line, we believe the people of the Pine Lawn phase continued this practice, and the residence and all property were held by

Uncovered in a pit-house of the Pine Lawn phase, burial number 54 proved to be of a later period. The painted pottery is Mimbres Bold Face Black-on-White; it dates the whole burial in the Three Circle phase. Also with the skeleton were a Neck Corrugated jar, a hammerstone, and a necklace of disk-shaped stone beads.



the mother-line. The economic position of woman was strong.

We also assume that like all other peoples, these early Mogollon Indians had religious convictions and dogmas. This seems reasonable since we have excavated several extra-large pit-houses that contain no evidence whatsoever of domestic usage, but do show some curious and as yet unexplained features.

To sum up the Mogollon culture at its inception, we may describe it as undeveloped, unsophisticated, withdrawn, rural, and having few contacts with other cultures. Though crude and primitive, the people of this Valley at about the beginning of the Christian era had overcome many obstacles and had started an upward trend.

THE NEXT THREE periods, named *Georgetown*, *San Francisco*, and *Three Circle*, dating roughly from A.D. 500 to 1000, are easily distinguished one from the other by the worker in the field. But for the purposes of this article, it may be well to group these three phases together. Life slowly changed



Rectangular pit-house E with the long passage-entrance, on Turkey Foot Ridge, from the Three Circle phase, A.D. 900-1000. The fifty-centimeter arrow pointing north and the meter stick in the background suggest the size of the house. The objects are primarily milling stones, the metate and the manos, or hand stone. Note the regular placing of the central and corner postholes.

Three Circle Red-on-White bowl, with a typical complex geometric decoration. Irregularities show that it was built up by hand rather than on a wheel. It was found in pit-house E, illustrated on the preceding page. Diameter, 31 centimeters.



during this span of 500 years. The enemy who harried the people of the Pine Lawn period must have been conquered, for we find that now the villages of pit-houses were built in choice spots near streams and fields rather than on top of high mesas. Round pit-houses had gone out of style; instead, rectangular shapes were all the rage. And in place of large homes capable of housing father, mother, children, and relatives on the mother's side, the houses were much smaller. Cooking was now done in fire pits within the house. Food was no longer stored in floor pits but in basket containers. Some tools of stone were being superseded by newer types deemed more efficient or important. (Mortars and pestles were replaced by different types of milling stones.) The gathering of wild food plants was now probably a thing of the past; implicit dependence was placed on agriculture.

Perhaps the best external evidence for advancement

in the arts comes from the pottery, basketry, sandals, and cloth. Sometime shortly after A.D. 500 the Mogol- lon Indians bethought themselves of decorating their pottery instead of remaining content with the plain, undecorated brown and red wares of their forefathers.

The first designs were done with red paint on a brown background. During the centuries the designs developed more complexity and were better executed until, at about A.D. 900, the designs and layouts became so skilfully worked and interwoven that they excite the praise of modern ceramists. Basketry and sandals were better woven and more varied in patterns; cotton cloth bearing woven designs in color came into being.

There were, then, advances in the arts, in architecture, handicrafts, and domestic economy during this period. Since we know by reconnaissance of the area that there were more houses at A.D. 900 than at A.D. 500, we assume that the density of population had increased.

AT OR ABOUT the year A.D. 1000, profound changes in the material aspects of the culture



Digging crew cleaning the floors of the Wet Leggett Pueblo dating from the Reserve phase, A.D. 1000-1150. Built above ground, the stone walls preserve very well the floor plans of these multi-roomed structures.



Pottery jar, 24.2 centimeters high, found in the Wet Leggett Pueblo. The plain and indented corrugations decorating the upper half may have been suggested by a basketry covering used for protection or as a means of carrying.

took place. The two most easily observed alterations are in architecture and in pottery.

Heretofore, everyone in the Valley had lived in pit-houses. Now these were no longer constructed; and in their place we find *surface* rooms, contiguous, in large complexes (two to ten rooms), and with walls of masonry. Imagine, if you can, how radical this change was. Would any of us (ex-

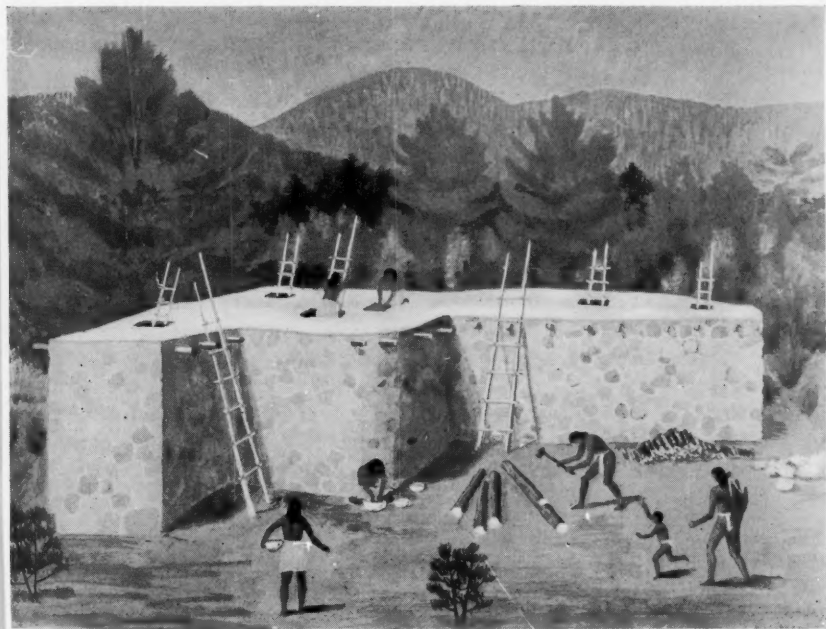
cept possibly rebels) be willing to give up the house style to which we are accustomed and live instead in houses built on stilts, in underground houses of one room, or in houses of "Dymaxion" style? And all at once—overnight so to speak? I think not. Reflect on how we cling to the conventional, orthodox types of houses and how few of us really like modern, radically but sensibly designed homes! But in the *Reserve* period at about A.D. 1000 everyone changed; and apparently it was not by force of conquest. This changeover was brought about entirely by social pressure.

The pottery, too, reflects a great metamorphosis. The red on brown decorated wares were displaced by a black on white pottery with designs similar to those in vogue among the Indians who lived near the present Gallup, New Mexico.

These two radical changes, plus minor ones, probably represent ideas borrowed from the Pueblo Indian culture that was flourishing about 150 miles to the north.

We conjecture that the Mogollon social structure remained unchanged. If this is true, these Indians continued to reckon descent and inheritance through the mother-line, with several related families occupying a village.

Although our excavations have not proceeded beyond the *Reserve* period (about A.D. 1000-1150), we know from our archaeological surveys that the Mogollon culture continued to



Hypothetical reconstruction of the Oak Springs Pueblo. On the basis of archaeological finds it is possible to suggest the activities of the inhabitants during the *Reserve* phase—the gathering and preparation of food, wood chopping. Painting by Gustaf Dalstrom, 1947.



flourish here for about a century longer. After that time, Indians abandoned the area for reasons unknown, and it remained uninhabited, by sedentary people at least, for about four hundred years, until it was reoccupied by Europeans.

**H**OW DO WE KNOW all this? Primarily through looking and through digging.

The earliest traces of man here in the Valley we found by walking in the bed of the stream along which the first Cochise settlers camped. From the banks of the arroyo several feet below the present surface of the earth and exposed by a recent erosion cycle, we were able to pluck concave-surfaced and slab-like milling stones, or metates, scored from the back-and-forth motions of the handstones, or upper parts, of the milling stones; spear points of obsidian and quartz; large, crudely flaked stones that were the axes or choppers of the day; pestles; scrapers; and other tools of stone, all necessary to a people who depended more on wild plants for foods than on animals.

In other places we find saucer-shaped depressions that mark, to the experienced, the collapsed remains of pit-houses. These are usually found on high, defendable mesas. In still other places, near or on the valley floor, we spot piles of rocks in apparent disorder. These represent ruined, multiroomed pueblos, or villages, with walls of masonry built on the surface of the ground. Scattered about, near the ancient habitation

Dr. John B. Rinaldo excavating mummy number 2 in Tularosa Cave. Patience and the brush are essential tools in the removal of dirt from the fragile items. The cave, which yielded about 3500 specimens, contains a complete stratification of Mogollon history from about 2500 B.C. to A.D. 1300. The hair, skin, teeth, and nails of this mummy were remarkably well preserved. It lay on a rush mat with a deerhide headrest.

sites, we find pieces of pottery—known to the trade as potsherds—and stone chips by the thousands, strewn over acres.

These things that I speak of are not rare, to be found only by the archaeologist. Every man, woman, and child of the Valley knows what we seek, for they have all observed these imperishable traces of ancient cultures, and they all aid us eagerly.

Thus we have pieced together the story. But it is based on many, long, sweaty hours of digging in dusty caves or in ruined houses that were built in the open. After the digging comes the patient analysis of the meaning of all the data. The historical reconstructions are based on thousands of minutiae excavated and recorded with care; on common sense interpretations (a sharp, pointed, slender bone tool with an eye was probably used for sewing; charcoal found in a scooped-out pocket in the floor of an ancient home probably means that fire was maintained there by man for one or more purposes); and on some assumptions.

**B**EFORE CONCLUDING, it might be well for me to state briefly why we have carried on excavations for so many years in this one valley. At the end of ten seasons' work in southwestern Colorado, we decided in 1939 to investigate a newly discovered culture called the Mogollon by its discoverers, GLADWIN and HAURY. Except for the latter's two seasons of excavations on Mogollon sites, this culture was unknown. After conferring with our colleagues HAURY and SAYLES, we selected Pine Lawn Valley near the town of Reserve, New Mexico, for several reasons. First, it lay almost in the geographic center of the southwestern culture-area; two, it was *terra incognita* in that no extensive archaeological work had ever been carried on there; third, it was within the Mogollon culture-area and contained many Mogollon sites of various ages. We felt that we should stay in the Valley until we had obtained all possible data on the Mogollon culture from early to late. We now know that the Valley was continuously inhabited for about 4,000 years. If we can piece together the history of cultural development for the area, we shall have one of the longest archaeo-

logical spans in the Southwest. To date we have published six reports on the Mogollon culture of this area and have another in press.

In other words, an important culture of the Southwest that was largely unknown prior to 1939 has been under investigation by us for eight seasons. The work we have done thus far has closed the gap between 2500

B.C. and A.D. 1000; and a continuation of the work will close the gap between A.D. 1000 and A.D. 1350. We hope to conclude the work here and then to follow the path of the Mogollon people after they abandoned this area. In what direction they went, we cannot as yet say, but we are working on that problem, also, in addition to our excavations.

## *The 1951 Season in Pine Lawn Valley*

THE CHICAGO NATURAL HISTORY MUSEUM EXPEDITION to western New Mexico devoted the major effort of its 1951 season to early habitation sites of the Mogollon Indians in Pine Lawn Valley.

One site consisted of a cave with a one-room structure at its entrance. In the cave, in addition to more than 1500 stone tools of the pre-pottery period (c. 2700 B.C. to A.D. 1), diggers PAUL S. MARTIN, field director, and JOHN B. RINALDO, associate, recovered tools of bone and antler, objects of leather, string, matting and basketry, sandals, cigarettes, bows, arrows, and other articles of substances usually considered perishable, but which here, because of the extraordinary dryness in the cave, have survived in fine preservation.

In the same area was a small one-room masonry house, perhaps a watch tower, which concealed a gruesome but important discovery: beneath the foundations of this house was found the headless skeleton of a young girl. In some primitive propitiation of the god of war, the victim had been sacrificed by beheading, and her body laid upon the ground, after which the wall was built directly over it. Human sacrifice was commonplace among the Mayas of Yucatan and among several tribes in our own western states, but this is the first instance reported from the Mogollons.

A second major effort of the 1951 campaign was the excavation of Cordova Cave, another Mogollon habitation site overlooking Pine Lawn Valley, 1200 feet above the valley floor and a steep mile and a half from the river, nearest source of water. Unfortunately for the archaeologist, this cave had been burned out. The fire is betrayed by an ash layer, six to fourteen inches thick, running from wall to wall and from front to back.

In the upper levels, all objects of wood, leather, and plant fibers, and all other perishable artifacts, were destroyed. Objects of stone, such as knives, scrapers, and arrowheads, and pottery fragments survived, and by their characteristic shapes enable the diggers to fix the date of the fire in about the first century A.D. From the lower levels, however, perishables were discovered in good preservation.

Under the direction of ELAINE BLUHM another structure was partially cleared during the 1951 campaign, a long

rectangular building of ceremonial character, probably a kiva. At some long-ago date the roof of the building was burned and its timbers collapsed on the floor—a disaster for the residents, Dr. MARTIN points out, but glad tidings for the archaeologist who will expect to find, sealed under the charred debris, the remains of the weapons, pottery, tools, and other furniture and personal possessions of the occupants which were in the building when the fire broke out. Because tons of rocks which once formed the masonry walls had collapsed inwards, digging was very slow, and the excavation was left half done, to be completed during the 1952 campaign.

THE CHICAGO EXPEDITION has been extraordinarily successful in locating and exploiting the dry caves of New Mexico, but work in a dry cave has its drawbacks. Dr. MARTIN has furnished an eloquent critique from the point of view of the man with the trowel:

"Digging in a cave is far from pleasant. The dust and heat are oppressive; and the wearing of masks and goggles—an uncomfortable and trying experience—is absolutely necessary to give protection from toxic, nuisance, and pneumoconiosis-producing dusts. Added to these discomforts is another—inadequate ventilation. The caves that we excavated in 1950 and the one . . . done in 1951 are small—about 40 feet deep by 30 feet wide at the mouth and 6 feet or less high. At the end of a day, the workers look as if they had been working in soft-coal mines.

"Fortunately for us, these caves are usually far removed from roads and trains and high tension electric lines. I say 'fortunately for us' because if the caves were easy of access they would have been stripped and pilfered long ago by vandals. But since we have to take the good with the bad in all phases of life, we accept the fact that a 'good' (that is, undisturbed) cave is never near an electric power line. Hence, good lighting and ventilation are beyond our reach. A portable generator might be used, but the expense of one is prohibitive; and the problem of transporting one to or near the cave would be difficult if not impossible. Therefore we get along without forced ventilation, and for illumination we use portable, chargeable, wet-battery electric lamps."

# A BRONZE STANDARD FROM PERSIA

By Elie Borowski

*Dr. Elie Borowski was born in Warsaw, Poland, in 1913. He obtained his Ph.D. at the University of Geneva, having studied also at the Universities of Berlin, Florence, and Paris. Later he studied at the Pontifical Biblical Institute in Rome. During the first year of World War II, he served as an officer in the French army. Then, during his internment in Switzerland, he did special research on Near Eastern cylinder seals for the Musée d'Art et d'Histoire, Geneva, and acted as a special consultant in the field of Near Eastern art for several Swiss private collectors. This work led to his book *Cylindres et Cachets Orientaux conservés dans les Collections Suisses*, published in 1947. For two and a half years, 1949-51, he was Lady Davis Fellow at the Royal Ontario Museum.*

**T**HE BRONZE DISK ILLUSTRATED IN FIGURE 1 is one of several fine pieces recently added to the Near Eastern collections of the Royal Ontario Museum, Toronto. The Museum purchased it from the estate of the late Professor F. SARRE of Berlin, who had purchased it in Teheran during the winter of 1897-98.

The disk is  $6\frac{1}{8}$  inches in diameter, and the total height of the object is  $8\frac{5}{8}$  inches. The flat ring which is structurally its most important element is  $\frac{3}{4}$  of an inch thick. This ring is molded, with four concentric ribs filling the surface of each side, and with a thicker band at each edge. At the top of the outer edge is a couchant animal with its head turned to the left. Professor Sarre described it as an ibex (*Klio* 6, 367, 370), but now that the bronze has been treated we are inclined to think that it is a calf; it has small laterally horizontal horns and a long tail curved over its hind-quarters. Six ducks, with heads twisted over their backs, are spaced at regular intervals around the circumference. The ring encloses four masculine figures—heroes or demons(?)—who are running, heads outward, in concentric arrangement. They wear knee-length skirts secured at the waist with a girdle, and suspender-like diagonal bands from the shoulders to the center of the girdle. Each man touches the buttock of the one in front with the sole of his forward foot and the shin of the one behind with the sole of his other foot. Touching the ring and midway between the heads of the men are four short rods, each grasped by the two men adjacent to it. The

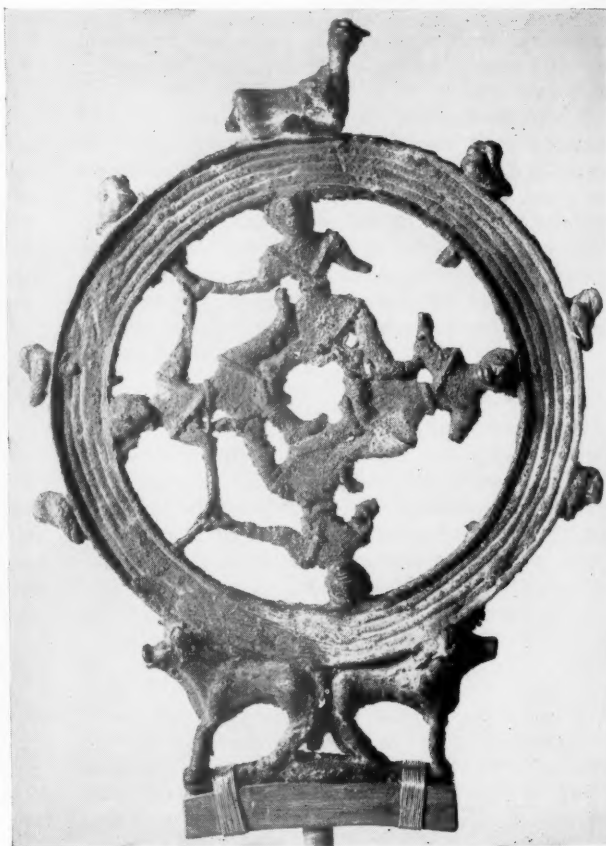


Fig. 1. The standard finial in the Royal Ontario Museum (ROMA photograph)

whole effect of the openwork composition is that of an eight-pointed star. The disk rests on two bulls standing back to back. Except for the calf, whose head is turned to the left, the object could be viewed equally well from either side: both sides show the men with face and shoulders in front view and with legs in profile.

Cast by the *cire perdue* process, the bronze was in an advanced state of decomposition when it arrived at the Museum. Treatment by Mr. WILLIAM TODD, Chief Preparator, re-

moved the chlorides and clays from the surface, which now has a solid malachite coating interspersed with areas of red cuprous oxide. The fine design and modeling may now be more fully appreciated. There are two breaks in the lighter work of the central composition, so that parts of four arms and two rods are missing.

Our piece is similar in size and design to a bronze in the Louvre Museum, also from Persia, shown in FIGURE 2. In the latter is preserved the pierced bronze tube that reinforced the top of a wooden shaft, an element missing in ours; it is decorated with three figures related to the four within the disk but standing with hands grasping the bars that separate them. The couchant animal at the top of the Louvre piece turns its head in the opposite direction to ours, and has been described as a deer. The two disks, however, are so similar that they must have been made by the same craftsman, although in different molds.

Fig. 3. Standard from a sculpture depicting the army of Sargon II (Gressman, *Altorientalische Bilder*, figure 537)



Fig. 2. The standard finial in the Louvre Museum (*Encyclopédie Photographique de l'Art*, II plate 38)

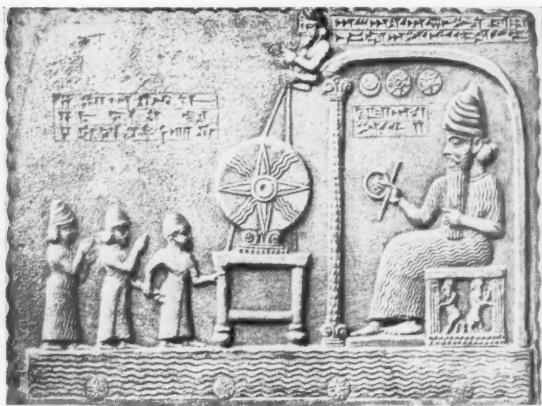
THE WHOLE COMPOSITION of these two objects points to astral symbolism. In Assyrian and Babylonian mythology bulls are often associated with the sun-god. In the standard shown in FIGURE 3 two bulls stand in a position similar to ours, and sun rays emanate from between them, while the god Assur, who has taken over the attributes of the sun-god, shoots with his bow to bring victory to the Assyrians. The symbolism of our piece is similar, when the whole disk resting on the bulls is interpreted as the sun.

The tablet in FIGURE 4 shows the sun symbol with a highly stylized rendering of the rays, which alternate with the four points of the star. The rays are similar in treatment to those in FIGURE 3. These and other pictures suggest that the four concentric ribs of the ring in our object also symbolize the sun's rays. The four heads of

the running figures and the four rods with the arms grasping them on either side combine to suggest an eight-pointed star such as the sun symbol in FIGURE 4. The four runners also suggest a swastika, a common symbol in Near Eastern art which has been found in association with sun worship. The violent rotation of the figures conveys the idea of infinite rapidity. The rods which they grasp can perhaps be conceived as spokes, connected with the notion of the sun as an endlessly revolving wheel. Finally, the ring enclosing



Fig. 4. (Below) Tablet of Nabu-apal-iddin, British Museum (Schaefer and Andrae, *Kunst des Alten Orients*, figure 523)



the figures may symbolize the ring that is the emblem of the sovereign power of the god Assur.

ITS ELABORATE SYMBOLISM makes it clear that the object was intended to bring divine protection. In what manner was it used, and did it serve a more practical purpose as well? Assyrian relief sculptures, such as that reproduced in FIGURE 5, show that similar standards were carried on the battlefield, and functioned somewhat like the banners of modern regiments. These Assyrian standards cannot be far removed from the standards mentioned in the Holy Scriptures (Numbers 1.52; 2.2), that served as gathering points of tribes while they were on the march or setting up camp. The Toronto standard somewhat resembles the well-known Luristan pins, or "standard finials," which are generally assumed to be merely



Fig. 5. (Above) Assur-nasir-pal's charioteers (Layard, *Monuments of Nineveh*, I plate 22)

ritual objects. The Luristan finials, however, are not always round but may be square in outline, whereas in the Assyrian battle scenes the standards are always circular. Moreover, the Luristan finials are not always in openwork, and the design may be visible on one side only. The standards in Assyrian relief sculpture are pierced so that their device could be seen from both sides and at a distance. Our standard resembles them much more closely than it resembles the Luristan standards. It is quite distinct from the latter in the treatment, weight, and strict circularity of the ring, and in the boldness of the composition. It would be suitably conspicuous on the battlefield.

Neither the Louvre standard nor ours came from an excavated site. They can be dated to about 800 B.C. on the analogy of the standards in Assyrian sculpture, and we think that they too were used in warfare.

### Preview of ARCHAEOLOGY, Summer Issue

DONALD McCOWN writes of his recent excavations at *Nippur* and the remarkable finds he has made there;

BRUCE HOWE, just back from *North Africa*, tells of his latest discoveries;

WALTER FAIRSERVIS reports on last season's exploration and excavation in *Baluchistan*.

Besides these accounts of excavations and new discoveries, there are articles on Roman coins as propaganda, the Luristan bronzes, ancient Inca highways, the Delphic Oracle, and a cast-iron helmet elaborately decorated with silver, turned up by a clandestine dig in Syria.



Photo: Saul S. Weinberg

Fig. 1. "Cat-and-Dog" fight statue-base relief, dating about 510 B.C., National Museum, Athens.

# CAT OR MARTEN?

By Sidney S. Schipper

*Toronto-born and educated, Sidney Schipper earns his living in the manufacturing fur business and his enjoyment in writing and study; he is a member of the Canadian Authors Association. Mr. Schipper's several interests are combined in this article.*

A GROUP OF STATUE BASES DECORATED WITH RELIEFS was found in 1922 in one of the streets of Athens, and was first described in the *Journal of Hellenic Studies* 42 (1922) 104-105 by ALEXANDER PHILADELPHUS, then Ephor of Antiquities of Attica. His account was merely a description accompanied by photographs, containing a straightforward statement of the identities of the figures without explanation of how he arrived at these identifications. With the exception of the so-called 'cat' the figures pose no very difficult problem. In order to gain a deeper and more accurate insight into the life of ancient Greece and thus facilitate a more personal appreciation of Greek art, it is necessary to identify more correctly the small creature here portrayed.

The square statue base had on its sides low relief scenes of the recreations enjoyed by the Greeks of the late sixth century, that is, as Mr. PHILADELPHUS says, about 510 B.C. He points out that the "advanced archaic style" marks these pieces with this date. The side of the base (FIGURE 1) which requires further study is a picture of the moment before a dog and the so-called 'cat' are to be released from their leashes when, as is obvious from their



Fig. 2. Coin of Tarentum, about 443-400 B.C. From Richter, *Animals in Greek Sculpture*, figure 176. The Tarentines evidently were the first Greeks to keep the cat as a common household pet.



Fig. 3. Cat and dog, from William Hogarth, *Industry and Idleness*, September 30, 1747, plate IV.



Fig. 4. Cat and dog.

Photo: Lisa Larsen

moods, they will fall upon each other in mortal combat.

Before exhausting ourselves on a survey aimed at identifying this small animal, it might be wise to ensure that these figures are an accurate portrayal of their living counterparts, for were this not so it would be useless to begin. A survey of Greek animal sculpture of the late sixth century B.C., as portrayed in Dr. GISELA RICHTER's fine book, *Animals in Greek Sculpture*, assures us that we may trust our artists. We find that they faithfully duplicated the living models—the proportion, the outline and contour, but with the exception of ears (which are frontal and stuck on) and hair detail (which is merely suggested instead of actually cut). This aversion to showing hair continued for a long while, but we must consider that the task of cutting hair in marble is quite a staggering affair even with modern tools. However, our Greek sculpture does use the outline mass for hair, that is, an outline with depth

which in no way decreases the fidelity in portrayal of the species concerned.

LET US NOW examine cats. As seen on the coins of the late fifth century (FIGURE 2) the cats are those we know today. They are typically round-headed, puffy-cheeked, slim-waisted, and lithe. The face is flattened. The tail is skinny and of proper length, the ears small, correctly shaped, and pointed. Thus we know that we have a direct comparison with our 'cat'; we know we may trust the shape, proportion, and mood of the animal in the base; and we know we may use some license in comparing tails and ears.

In 1881, F. LENORMANT wrote in *La Grande-Grèce* 1, pages 97-98, "The Tarentines were the only Greeks who habitually kept the cat in the house as a domestic animal. . . . Other than the monuments of Tarentine origin which I am going to note, the image of the cat is not found in any Greek work of art."

In 1930, G. M. A. RICHTER wrote of the cat in Greece (page 34), "The earliest occurrence of it at present known is in the cat and dog fight . . . where the form of the head, body, and tail and the characteristic attitude of the curved back point to the animal's being identical with our cat. Remarkable, however, is the rendering of the bony construction—the shoulder, the ribs, and the muscles of the hind legs—which in both wild and domesticated cats is practically hidden by the fur. Perhaps the Greek artist's sense of structure is responsible for this variation."

More recently, FRANCIS D. LAZENBY says in *Classical Journal* 44 (1949) 301, "Perhaps the earliest artistic representation of the cat among the Greeks is the famous 'cat-and-dog' fight statue-base in Athens. The work is dated ca. 510-500 B.C. I do not think, however, that the physical appearance of the animal entirely agrees with that of the domestic cat, but that, of course, may be the result of the artist's style." (Italics mine.)

PERHAPS NOT! The Greek artist's sense of structure and style proves this is *not* a cat. Other Greek artists have modeled cats, and the shape of the head, the curve of the back are entirely different from this animal. Look again at the coin of Tarentum.

More specifically, let us examine an angered cat

Fig. 5. Canadian (yellow-throated) marten.

Photo: Canadian National Parks Collection



as portrayed in Plate IV of the famous *Industry and Idleness* by the great eighteenth-century English artist WILLIAM HOGARTH (FIGURE 3). This engraving includes in the lower left hand corner a dog and a cat in poses similar to those of our base relief animals. No one will deny the reliability of HOGARTH's portrayals. Let us also use for comparison a recent photograph of a cat and a dog under identical emotional conditions (FIGURE 4).

Even at first sight it is obvious that the smaller animals differ. As HOGARTH and the photograph show, the cat takes up its natural position of defense by humping its back in the middle, raising its tail, and raising its paw or at least having it free for action, since the cat's traditional weapons are its claws. The cat's fur stands up and the creature spits in an effort to scare off the opponent with a frightening display of pugnacity.

On the other hand, the marten hunches its back near

the rear, preparing to spring; the tail goes down and the teeth are bared, since the marten's weapons are its needle-like teeth. While the cat backs away from the dog, the marten edges towards him, a difference in behavior determined by heredity and by the traditional use of claws or teeth as weapons of offense. In addition, notice the short forelegs of the marten (FIGURES 5, 7) and the very long ones of a cat (FIGURE 6); the large, solid marten's paws, so necessary for life in the woods, compared with the small nimble paws of the cat. The cat is not an awkward-appearing animal since its forelegs are about two-thirds the size of the hind legs. The marten family, on the other hand, is noted for its short front legs. And the tail is distinctly different. When a cat has its back up, its tail also rises, but when the marten hunches, the tail drops in a long smooth sweep.

Other obvious differences appear in the head. The pear-shaped profile of a marten's head is far different from the rounder one of the cat. Looking at the mouth and snout of our figure, we see an array of canine teeth common to all carnivores; while the cat scratches, the marten bites. Notice the ear. The true weasel and mink have very small flat ears. But their cousins, the martens, were blessed with large, high, pointed ears. Of course, the archaic convention that impelled the artist to use the frontal eye also caused him to perch the ear right on top of the head. The weasel and mink are small creatures whereas our figure, by actual measurement, is exactly five-ninths the size of the dog. The marten, we know, is over two feet long while this type of hunting dog is usually about four feet in length.

Lest anyone attempt to compare the figure with the rodent family he should be reminded that the rodent tail is hairless, scaled, long, slim, and tapering to a point. In addition the average size runs even smaller than the weasel, with the exception of rabbits and beavers. Nor can we accept the suggestion that this animal is a wildcat since, as *The Cambridge Natural History*



Photo: Star Newspaper Service

Fig. 6. The cat (*Felis Domesticus*).

points out, "The real wildcat differs from the domestic races by the proportionately longer body and limbs, the shorter and thicker tail."

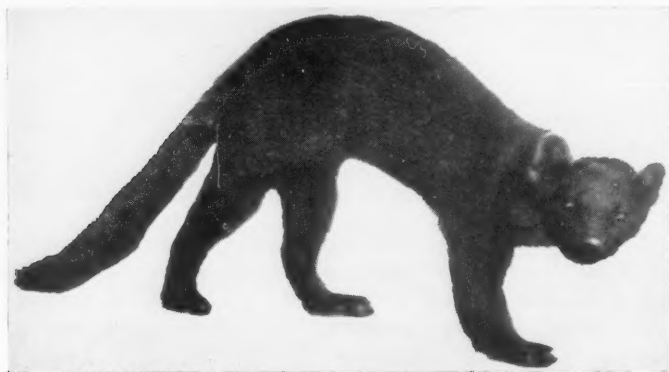


Fig. 7. Pine Marten.

THUS WE MUST conclude that what we see in the statue base (FIGURE 8) is a marten. There are two types of marten common to southern Europe: the pine marten (FIGURE 7) and the stone marten (also called beech marten). The stone marten lives more to the south and is happily at home among the forests of evergreens such as were preferred for the setting of the ancient Greek temple. The most obvious difference between the profiles of the two is seen in the tails. The beech marten's becomes more bushy near the tip than does the fairly regular tail of the (yellow-throated) pine marten. In tracing the history of these animals we should notice that the foxes, hyenas, wolves, and all the other animals of ancient Greece are almost identical with their descendants of today. We may have no fear in assuming that the beech marten of today is essentially the beech or white-breasted marten of Aristotle's *Historia Animalia*, or of Aristophanes' *Acharnians*.

Much confusion exists among translators regarding the Greek words *gale*, *iktis*, and *ailouros*. As Mr. LAZENBY points out, and as this writer discovered in a survey of such authoritative sources as JENNISON and LENORMANT, as well as such eminent translators as A. L. PECK, D'ARCY THOMPSON and C. D. YONGE, *ailouros*, *gale*, *feles* are all words accepted by some as denoting the housecat, by others the wildcat, the weasel, the marten.

However, Dr. ROLLESTON, writing in the *Journal of Anatomy and Physiology* 2 (1868) 146, was of the opinion, after a thorough investigation into Aristotle

and Aristophanes and their contemporaries, that the white-breasted marten (*Mustela Foina*) "was the animal which the ancient Greeks and Romans employed for the same domestic purposes for which we employ *Felis Domesticus* (the housecat)." Further, consider some of the phrases built around the word *gale*. Some of them refer to omens, implying a relationship between the *gale* and wagering. This would explain the purpose of the contest we see in our relief.

That the marten was common in ancient Greece there is no doubt. As for the cat, Miss RICHTER herself, in assuming that our animal was a cat, concludes that this is the first appearance of the cat in ancient Greek art, and wonders at its disappearance for the next hundred years. If, however, we agree that this is a marten, the problem is solved and the cat's introduction into Greece as a domestic animal may

be placed late in the fifth century B.C. An important factor deterring the importation of cats from Egypt was that this Egyptian holy animal was guarded by laws demanding death for violation of the cat's sacred person. It is difficult, then, to believe that any Athenian would risk such a rare possession in a fight with a powerful hunting dog.

ALL THE WRITERS heretofore investigated seem to agree that the marten was a household pet before the introduction of the cat into Greece. Dr. ROLLESTON was convinced that the cat finally supplanted the marten because of its more even temper and because it did not steal like the marten. "The very points also," he insists, "in which as a wild animal it [the cat] is inferior, make it superior as a domestic one to a musteline." Modern naturalists add further proof of the viciousness and the domestication of the marten. "The marten is just as blood-thirsty as the mink but he can be tamed into a pet," says A. C. LAUT in her *Fur Trade of America*, page 103. H. PATTON, in *Raising Fur Bearing Animals*, page 285, observes, "When angered a marten will growl much as a coon would do; then it will attempt to attack. . . . The marten hangs on with bulldog tenacity. . . ."

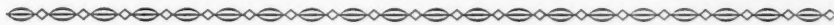
Thus we see that the marten is superior to the cat as an adversary for the hunting dog. From the marten's viciousness, his love to kill, his quick, elusive, and slashing attack arise the high drama and the ancient artist's desire to preserve the scene in stone as he did the

other recreations of the Greeks of his day.

Knowing now that this animal is a marten, we feel an even greater tension in the scene on the relief. The *marten-dog* fight was a special occurrence and therefore one worthy of permanence in stone: the hunter versus the hunted—but this time in the arena with backers for both. More savage emotions find their way to freedom, and there is the promise of a fight to the death, with the marten having a better chance for victory than would a cat. Neither the marten nor the dog will run away to lick his wounds; both will do or die. And the marten's master would not be the fool he might have been had he wagered on a cat!



Fig. 8. So-called cat, detail of figure 1.



Greek drinking cup, about 530-520 B.C., five and one-eighth inches high

## HIPPALEKTRYON

Out of the stable of fantastic fauna gallops a beast half cock and half horse, a sound that is neither crow nor whinny in his throat. He goes by the name of *hippalektryon*, and with his young rider was painted some twenty-five hundred years ago on a Greek drinking cup of Attic make, recently acquired by the Metropolitan Museum of Art, New York. *Hippalektryon* is one of the rarest of the hybrids spawned by the Greek imagination. His representation on this elegant, two-handled drinking cup, or *kylix*, is one of about a dozen



Photos: Metropolitan Museum

known to scholars. The grace of this strange figure in the bottom of the cup, with its cock's tail and horse's body, is echoed in the flowing lines of the vessel, one of the finest pieces of Attic black-figure ware owned by the Museum.

# A SMALL BYZANTINE TREASURE FOUND AT ANTIOCH-ON-THE-ORONTES

By Marvin C. Ross

*Curator of Mediaeval and Subsequent Decorative Art,  
The Walters Art Gallery*

THE EXCAVATIONS MADE AT ANTIOCH-ON-THE-Orontes by The Committee for the Excavation of Antioch and its Vicinity, conducted between the years 1932 and 1939, resulted in finds which have added greatly to our knowledge of that region from Hellenistic times onward. This is particularly true of the mosaics, about which several important studies have been written revolutionizing our whole concept of the subject.

On May 28, 1938, Monsieur JEAN LASSUS found a small Byzantine treasure while excavating in Sector 16 at Antioch. This treasure has not as yet been noted in any publication, and Professor RICHARD STILLWELL of Princeton University has kindly given me permission to publish this brief notice and provided the necessary information and photographs.

The treasure was not large, consisting only of the fragments of a silver candlestick and three gold ornaments. The candlestick fragments were allotted to the Dumbarton Oaks Research Library and Collection in Washington, D. C., and the gold ornaments were left in Syria. The only indication as to the date of the treasure was its location under a pavement of a late period.

The fragments of the lampstand or candlestick (FIGURE 1) assigned to Dumbarton Oaks were carefully cleaned and put together by Mr. W. J. YOUNG of the Boston Museum of Fine Arts. When the fragments were put back together again, the lampstand (FIGURE 2) proved to be almost a duplicate of another found at Lampsakus, on the Hellespont in Asia Minor, and now in the British Museum (FIGURE 3). The

two lampstands have not only the same design and approximately the same size, but both are made with hollow feet. By analogy with bronzes, confirmed by contemporary illustrations, these sticks or stands could be used for candles which were put on the prickets, or for portable lamps to be carried from room to room and which had a base that fitted over the pricket and thus would rest firmly and not upset. Each stand bears the control stamps used within the Byzantine Empire, but the stamps are not legible enough to make comparisons. The best Byzantine silver of the sixth and seventh centuries is marked with five control stamps, the exact significance of which has not been worked out.

Finds of Byzantine silver of the fourth to sixth centuries

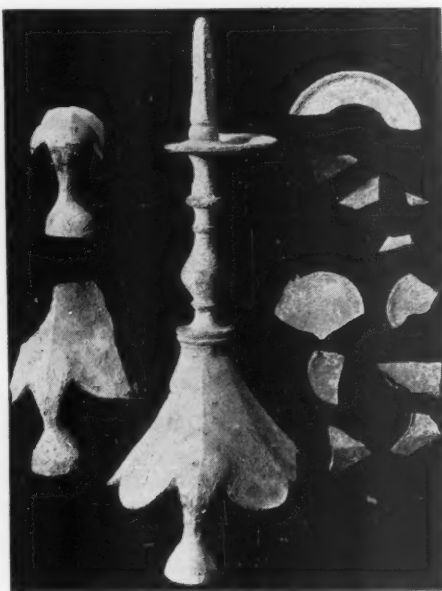


Fig. 1. Silver candlestick as found at Antioch. (Courtesy of the Dumbarton Oaks Collection)



Fig. 2. Silver candlestick found at Antioch as restored, 8  $\frac{3}{8}$  inches high. (Courtesy of the Dumbarton Oaks Collection)

have been considerable in the last decades. So far, however, the general study of the subject has not progressed enough for us to say more than that objects with control marks have generally been found in the eastern Mediterranean or in the south of Russia and along the Danube where such imports from Byzantium might be expected to turn up.

**T**HE GOLD ORNAMENTS (FIGURE 4) are of a type that has generally been labeled Byzantine. They have a punched leaf decoration, probably once filled with enamel or paste. A number of pieces of similar gold work with this type of decoration have been connected with the eastern Mediterranean and especially with Syria. In the Dumbarton Oaks Collection

there is a group of gold belt ornaments acquired in 1940 from a dealer who stated that they had been found in Syria. A gold buckle in the Walters Art Gallery, said to have been found at Hamah in Syria, has a leaf-like punched decoration on the tongue. Of other belt ornaments decorated similarly, one is in the Museum at Bagdad and another acquired from a dealer at Cairo was formerly in the Kaiser Friedrich Museum in Berlin.

Many imitations of this kind of gold work have been found on Langobard sites in Italy, in Germany, and along the Danube. They are often in silver or bronze rather than gold and appear quite definitely to be a local imitation of a popular type of gold ornament which was imported from the eastern Mediterranean, where all of the finest pieces first appeared. The finding of three superb pieces at Antioch, together with the information that the fine set in Dumbarton Oaks came from Syria, gives some justification for assigning this particular type of gold work to Syria, and possibly to Antioch itself, until further finds elsewhere disprove this.

An approximate date can be assigned to this type of jewelry. Most of the Langobard finds in Italy are from sites believed to be of the seventh century. Another belt ornament with the same kind of decoration was found at Weingarten in Germany with a coin of Maurice Tiberius (582-602). Thus the type can be dated in the late sixth or early seventh century (before 636, the date of the final Arab conquest of Syria).

The silver lampstand and the gold ornaments thus support each other as to date, both being assigned on different grounds to the late sixth or early seventh century. The lampstand adds another piece to the fast-growing *corpus* of Byzantine silver. The gold ornaments, taken with others found in the region, help us to localize a popular type of jewelry which seems to have been widely exported, since imitations have been found over a considerable area in Europe.

See additional illustrations on next page.

Fig. 3. Silver candlestick from Lampsakus in the British Museum 8  $\frac{3}{8}$  inches high. (Courtesy of the British Museum)



Fig. 4. Gold belt ornaments discovered at Antioch.  
(Courtesy of The Committee for the Excavation of Antioch and Its Vicinity)

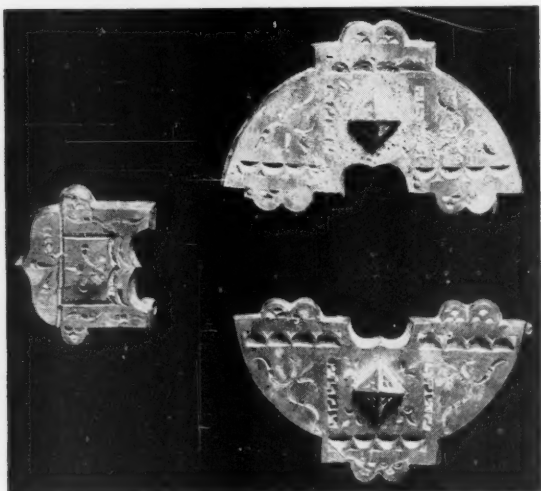


Fig. 5. Bronze lamp of the sixth century in the Walters Art Gallery. While not part of the treasure, it is the kind of lamp which fitted on a lampstand such as that shown in Figure 2. (Courtesy of The Walters Art Gallery)

#### RUTHLESSNESS

There was an archaeologist,  
Of gentle mien and kind,  
Who told his pupils of the sites  
They might expect to find.  
"You do not always have the luck,"  
He said, "in excavation,  
To find a city overwhelmed  
By instant devastation."  
Dictators may be ruthless, but  
I always will insist  
There's no one quite so ruthless as  
An archaeologist.

DAPHNE HEReward



Pisac

Lying 2000 feet below the ancient citadel, the present village is ageless. Although it came into existence before 1576, not much is known of it. The houses, usually one-, sometimes two-story affairs of wattle and daub, are roofed with sienna-colored tiles. It is a replica of a thousand little Andean villages. Pisac has, strangely enough, neither tradition nor leg-

end. All that is known for certain is that it was called *Sabubnasi* ("place where they make pottery"), and that the broad fields fell into the conquest dowry of the Dominicans. On the ridge in the foreground lie the ruins of a small look-out fortress. The Vilcanota river is still held in its course by walls the Incas erected centuries ago.

## THE MYSTERY OF PISAC

By Victor W. von Hagen

*All photos by Robert Shippee and the author.*

FIFTEEN MILES NORTHEAST OF CUSCO, THE CAPITAL of the Incas, lies Pisac, one of the great mysteries of Peru. Here are the vast ruins of a city-fortress in the upper Urubamba valley, a man-made cascade of Inca terraces and fortifications which hang perilously over the valley—a delight to the eye and a mystery to the archaeologists. Pisac village, however, has no mystery, for its Sunday market is visited each year by hundreds of tourists. They careen down the hills and into the warmth of the square dominated by its two huge ceiba trees, and there bargain for the colorful wares of the Indians of Pisac. Few tourists coming to the fair ever consider climbing those for-

bidding terraces that rise from the village edge, but should they do so, they would see the most spectacular ruin in Peru.

Pisac is shaped in an irregular oval three miles long. At its highest point it is 4,500 feet above the valley of the Urubamba where lies the modern village. The Inca engineers took advantage of this natural fortress, separated from the rest of the Andes by deep gorges on the south, east, and west, by constructing an amazing series of defensive forts, tunnels, and walls.

The ruins of Pisac are five times as great as those of Machu Picchu and cover more area than Cusco. Nowhere in all the empire of the Incas is there finer ma-



sonry, nor is there elsewhere, even at Machu Picchu, a plan so bold as Pisac, which crowns the long mountain spur and commands a wonderful sweep of landscape. What was Pisac, and why was so strong a fortress built so close to Cusco?

The function of Pisac becomes apparent only on study of a map of the region. For Pisac guarded the road (and valley) that led to the region of Paucartambo; and from the warmer lush valleys of the Andes came the coca-leaf, the "divine plant" which was chewed by the priests and the ruling class. Pisac also guarded, and prevented access to, the exceedingly rich regions watered by the river Amaru Mayu, which leads to Madre de Dios river. Here were gathered hostile Indians who wandered about the periphery of the Inca empire,

#### Look-out fortress

The fortress, large enough to house only a squadron of Indians armed with sling shots, is the key to this side of Pisac's defenses. In the Inca fashion, it is built of precisely fitted ashlar blocks. Time has shaken the top, but enough remains to show that it is the best Inca stone work of the classical period (1450-1533).

#### The Indian of Pisac

The part best known to the tourist is the village where the Indian comes dressed in his best for church and the market. The dress marks the region—the tortilla-flat hats worn by both women and men are pure "Pisac." They are green felt, trimmed with red and formed on top into conventionalized Maltese crosses. The headgear of the men is more impressive, wider, with the top often shaped like an inverted mushroom, and usually brilliant red. The ponchos, woven from homespun alpaca fleece, are somber in color, with browns, reds, and greens balanced in stylized patterns.

drawn by the rumors of its opulence. This is what Pisac guarded, and into its fortifications the Inca engineer put the perfection of his genius.

At the edge of the present village the terraces begin. From below they appear like giant steps cutting into the mountainside which rises sharp and sheer right over the village. It is only on mounting them that you can form an idea of their magnitude. They are not countless, but there are enough to make you lose count. So precise was the work that the stone steps are still in place; and although the canals that brought water to them have long since been broken, one can see the foresight of the engineers, for they brought the water down from greater heights in such a fashion as to be able to conduct it, all year round, to the entire group of terraces.

The second group of terraces hangs on the very edge of the mountain. Thirty-nine gigantic steps, pitched at a fifty-degree angle, scale the mountain to its first summit. The place is called *Hurmin* and is in perfect con-





### The ancient citadel of Pisac

Much of the ancient citadel appears in this view. The region of the *intibuatana* is at top center. Nearer, on the ridge, is *Coribuayrachina*, a set of ruins whose original purpose is unknown. On the same ridge, just off the left of the picture, is

*Hospitalneoc*. At the lower right is *Urin Pisac*, an agricultural village which housed the people who worked these terraces for almost a century before the Conquest. Stretching off the picture to the right is the terraced area known as *Cuscopata*.

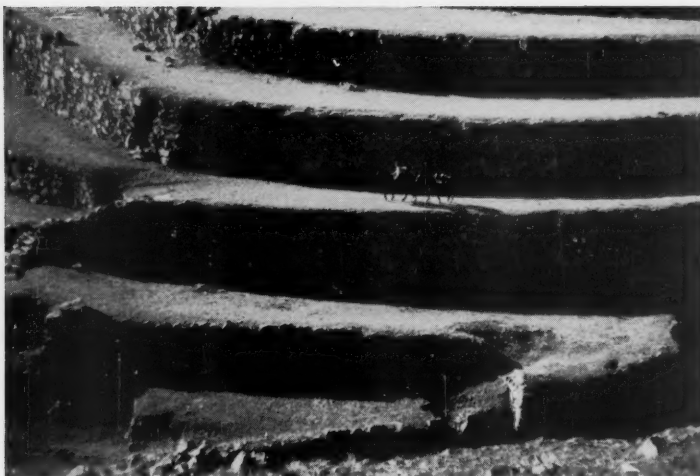
dition. The stone conduits still function; every stone is in place. Should they wish to, the inhabitants of Pisac could come back even now, repossess it, and begin the sowing of their crops.

Here, clinging perilously to the mountain, a road skirts the cliff and along the very edge of the abyss leads, by a flight of stone steps, to a small fortress. Here one can rest—breathing is difficult for it is 10,000 feet above sea level—and make the first survey of the valley.

YOU CANNOT APPRECIATE the architectural daring of the *pucara*, the citadel, until you have followed the tortuous paths that lead from one section to another, for these hanging terraces communicate with each other by narrow steep flights of stone steps. Beyond the fortress and downward are seven houses, more or less intact but roofless, in the section of Pisac

called *Hospitalneoc*, a word compounded of Spanish and Quechua. As the houses are large—some had two stories—they must have suggested to the later Indians something resembling the Spanish hospitals. They were naturally not that but possibly houses for the workers on the terraces or even barracks for the defenders of Pisac.

On the climb upward there is *Coribuayrachina*, another cluster of ruins, a fragment of a wall, which served no one knows what purpose. From here on there is a magnificent panorama of the other section of terraces of Pisac, which face the west and cascade two thousand feet downward to the small rio Chonga. There in the section called *Urin Pisac* are the remains of a small, self-contained village of 29 houses ranged in a semicircle. Excavation revealed streets which followed the curve of the planned village. The walls below are the well-hewn, well-fitted stones of the best



### Hanging gardens of Pisac

Like giant steps, the agricultural terraces, or *andenes* (whence, it is believed, comes the word 'Andes'), rise up the mountainside. About twelve feet high and deep, they are supported by rough stone work. Built in the late fifteenth century, the stone steps are still functioning. This illustration shows *Cuscopata* where are concentrated the most extensive *andenes* in Pisac. Corn, wheat, and peppers grow here as the terraces are still used by Indians of the region. Originally the garrison of the Serpent Gate was supplied from here.

Inca construction. Superimposed on this is an irregular stonework bound by cement-hard mud. All these houses were once roofed with thick grass and the interiors, as befitted people of rustic station, were bare and to us forbidding.

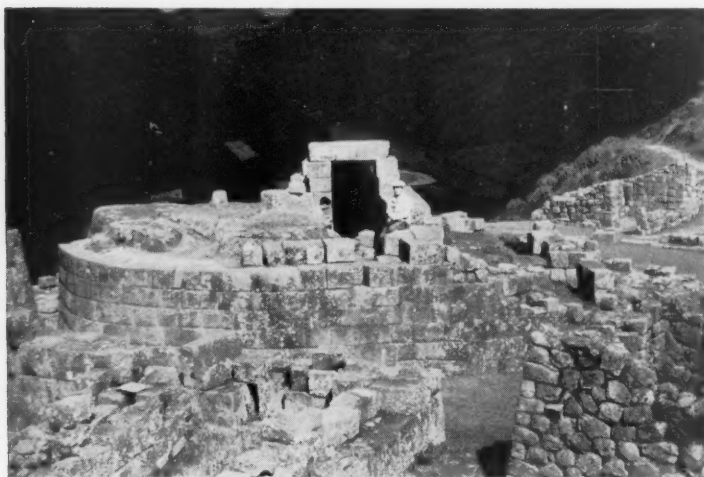
An eighth of a mile upward and onward, crowning the summit of the *pucara* of Pisac, is the solar observatory, a gigantic gnomon, on whose raised stone dial Inca priests watched the shadow of the sun, projected on its daily journey through the Andean heavens. It is

called the *intihuatana*. Although this mysterious "hitching place of the Sun" appears in other places throughout Peru (notably at Machu Picchu and Ollantaytambo) none is so massive and striking as the one at Pisac. What was the function of this mysterious sacred stone, a device found in all parts of the Inca realm? We do not know precisely.

That the Inca priests observed the movements of the planets, there is little doubt; that they paid especial attention to that earth-warming orb, the sun, there can be no doubt whatsoever, and there seem to have been various devices and contrivances by which the priests determined the solstices and equinoxes. That

The *intihuatana* is cut from the living rock. Roughly circular, it is 18 feet long and 16 feet broad. The conical indicator in the center is 16 inches high, about 11 inches in diameter at its base, and 9 inches at the top. It stands in the center of a large cluster of buildings. These seven buildings

were probably the abode of the attendants of the sun. The entrance to the sun-dial (if such it really was) is through a beautiful stone doorway, and about the sacred stone curves a wall marvelously wrought of stones fitted in perfect courses. The whole site is actually an outcropping of granite into which the Inca engineer cut to lay the base for the sacred wall. It is what the modernist would call "organic architecture," something that would please the demiurge of modern architecture, FRANK LLOYD WRIGHT, who says, "It is the nature of an organic building to grow from its site, come out of the ground into the light."



The Intihuatana  
"Hitching place of the Sun"

### Ruins of sun-palace

The buildings in the region of the *intibuatana* housed the priests, the sun-virgins, soldiers, and agricultural workers. The excellence of the stonework and its precise fitting point to the late fifteenth century, the classical period. Although the river sweeps around a bend in the valley, from here one can see the whole of the Urubamba massif and with a single sweep of the eyes rise from the sun-drenched valleys to the frigid, snow-bound *punas*.

they did so, almost all early Spanish chroniclers agree; but on how they did it, all disagree.

In open courtyards tall sculptured stones were erected and festooned with gold plate. It was the duty of the priests—accoutred in plumes and golden ornaments, and their ears extended by egg-sized earrings—to watch the shadow of the columns so as to observe the approach of the equinox. GARCILASCO DE LA VEGA remembered that on the day when the center of the shadow followed a definite line from sunrise to sunset and when, at noon, the rays of the sun fell full on the column so that it was bathed in light, the priests then declared that the equinox had arrived. Thereupon they decorated the gnomon with flowers and placed offerings—usually the still palpitating hearts of freshly killed llamas—near what they called the “Chair of the Sun.”

BACK OF THE *intibuatana*, where stone aqueducts carried water to the sacred rock, the real acropolis of Pisac begins. For Pisac is actually a fortress within a fortress; each rock is an independent area, like a modern pill box, designed to contain the advance of the enemy. Here, from a height overlooking the southern bas-

### Stonework detail

The pinkish-white and red granite of the wall enclosure is superbly constructed, and, as PHILIP A. MEANS himself confirms, “Nowhere in Incaland is the masonry here seen excelled for solidity, regularity and for austere dignity.” In some places, as here, the stones are meticulously trimmed and fitted together in jig-saw puzzle fashion to incorporate the granite outcropping.



tion of Pisac, an idea may be formed of the whole of it. Pisac was a typical *pucara*; it combined fortress, *intibuatana*, barracks, sun-virgin hostelryes, and dwellings for those who maintained it. It was a self-sufficient unit, designed with agricultural terraces to sustain the garrison that defended it. For this was the Inca military principle. There were no fortified towns since each center of importance had its *pucara* to which, when threatened, the entire populace would go, enduring siege and making strategic sorties until the invader was beaten off or retired. The great fortress of Sacsahuaman which commands the hills of Cusco, even though gigantic and a third of a mile long, was in fact





The Serpent Gate

The northern part of Pisac has the least natural protection as the ground subsides to a low and narrow ridge. Here are concentrated the heaviest fortifications, every avenue of ascent guarded, every strategic spot armed. A determined squad of defenders could hold off an entire army. At this point is the *Amaru Punku*, Serpent Gate, the only entrance in a wall that traverses the precipitous mountainside obliquely, dividing Pisac into two equal sections, the northern and southern. Five hundred feet above this gate there are other clusters of ruins of rustic construction, which resemble the cliff-dwellers' ruins in our own Southwest.

only such a *pucara*. So are all the other ruined cities of the Urubamba valley, typified by that most renowned of all Inca sites, Machu Picchu.

ON THE CENTRAL peak, above the *intihuatana*, the intensive system of defenses begins. The path, steep and devious, is extremely perilous, and at some points it is hardly possible for two men to walk abreast. On one side the sheer rock walls rise a thousand feet and on the other a precipice drops a thousand feet into the valley. There is a succession of small forts, and beyond, on the very crest of Pisac, a cluster of ruins. To the right of the pass, where the terraces dip down into the valley, a road passes along the cliff and then cuts into the mountain. Where there was a natural hole in the rock, it was enlarged, tunneled out, steps were cut into the living rock, and thus was fashioned a defense tunnel twenty yards long. There is no way to move to another section of the ruins without going through this passage cut in the mountain.

E. G. SQUIER, who had seen the ruins of Central America as well as many of the ruined Peruvian cities, was amazed by this citadel when he visited it in 1866:

... [On] natural shelves, reached in some instances only by stairways, are clusters of buildings, long and narrow, with tall gables, placed close together, with characteristic economy of space. In a word, every rod of surface that can be propped up by terraces and cultivated is carefully dedicated to agri-

culture; every avenue of ascent, except such as the engineers determined to leave open, is closed and every commanding and strategic spot is fortified. There is not a point to the very summit of the first peak of the mountain which is not somewhere commanded or somehow protected by a maze of works which almost defy the skill of the engineer to plan and which baffle description.

It is beyond the massive cyclopean walls of *Amaru Punku*, the Serpent Gate—the only entrance at the northern end of Pisac—that the mystery of the city is most evident. On the high escarpments are houses mentioned by SQUIER, of which we know little. On the east side of the terraces, where the gorge is deep and where the paved Inca road once led to the town of Paucartambo, is a vast promontory of soft limestone and sandstone. There, hollowed out tier upon tier, are chambers—they looked to SQUIER “like the nests of mud-swallows”—where the city-fortress of Pisac buried its dead. This cliff, visited only by SQUIER, is a mile long and for hundreds of feet “is literally speckled with the white faces of tombs.” It is called *Tantana Marca*, the Steeps of Lamentation.

SINCE SOME ADVENTUROUS person may wish to visit these mysterious tombs, we might lend attention to SQUIER who is promising, yet rather less than enthusiastic, in his description:

Some of the tombs were elaborately built of cut stones, the rock being dug away behind them, so as to form large chambers; but these have all been rifled, broken into and many of the others have also been desecrated, but most remain intact. They contain the desiccated, or dried bodies of the dead, bent in a sitting posture, with their heads resting on their hands, and their hands on their knees, wrapped in coarse cotton cloth or mats of rushes, with a few rude household or other utensils and implements surrounding them. The dry rarefied air of this elevation acts on the dead body very much as does the dry air and sandy and nitrous soil of the coast. Protected from the rain when rain falls, all flesh here dries up and hardens, and enclosed in tombs like those of the Steeps of Lamentation, bodies may be preserved for many centuries.

Pisac remains one of the great cities of mystery of Peru. Although the village is one of those most visited by tourists on Sunday, its acropolis is the site least visited by anyone, archaeologist or tourist. If one can be stirred by a really magnificent work of man or by

#### Water conduit

The *intibuatana* and the surrounding buildings were well supplied with water. Aqueducts brought it down from a higher level, and conduits distributed the water to all parts.



the mysterious, Pisac provides more than is ever dreamed of in heaven or on earth.

#### THE HORSE RACE

Illustrated here is a hydria or water jug, presumably made in Corinth between 575 and 550 B.C. The scene is a race of three frantic horses urged on by straining jockeys. The inscriptions, which by their spelling and letter forms give the experts something to worry about, are three names which probably apply to the horses, not the riders. At least the middle one, Xanthos, was a popular name for a horse, as witness the talking horse of Achilles in the *Iliad*. The vase, a recent acquisition of the Walters Art Gallery, Baltimore, had been known ever since it was illustrated in the catalogue of the sale of the Gréau Collection in Paris in 1891. It had long ago disappeared from view and the grapevine has it that it was rediscovered in a shop on Third Avenue, New York.—D. K. H.





## THE ARCHAIC GREEK HELMET IN ST. LOUIS

By Joseph Ternbach

*Mr. Joseph Ternbach studied at the Kunstgewerbe Schule, 1920-23, in his native city, Vienna, and received a Master's degree in arts and crafts and in sculpture. For several years he practiced as a restorer in the Kunsthistorisches Museum in Vienna. In 1939 he came to this country, settled in New York, and has since specialized as a restorer of sculpture.*

**Fig. 1. Right profile of the Greek helmet of the sixth century B.C., cleaned and restored. Found at the ancient Metapontum in South Italy, it is now at the City Art Museum, St. Louis.**

THE RECENT ACQUISITION BY THE CITY ART Museum, St. Louis, of a sixth century Greek helmet provides scholars for the first time with an extraordinary example of a bronze helmet of a design heretofore seen only on statuary, stone reliefs or vase paintings (FIGURES 1 and 2). In none of these instances, however, is there to be found a helmet of such heroic design, elegance, and proportion. In these respects the St. Louis helmet is unique as far as present knowledge goes. Decorated with repoussé ornamentation and engraving, its most striking feature is the sculptured ram's head on an elongated neck growing up from the bowl in a continuous line and surmounted by a majestic silver crest. Such decorated helmets, it must be assumed, served to distinguish the wearer and probably also were in some way symbolic for and an

identification of the wearer. This was a well-established tradition by the Middle Ages and perhaps had its origin in antiquity.

Moreover, study of the ancient coinage of Metapontum, where this helmet was excavated, reveals that for a period the ram's head was an important symbol on the city's coins (FIGURE 3). Although its exact significance is not established, there is good reason to assume that the ram's head identified the family of the monetary magistrate whose badge it was. From this, it would be understandable that an imposing helmet with a ram's head might have been created for a prominent military member of the same family.

Even though iron had been introduced long before, the creation of the St. Louis helmet in bronze indicates that bronze sheet metalworkers were still at the height

of their skill and that artists employed this medium for sculpture. The fame of these craftsmen is not unwarranted, judging from this specimen which was embossed from a single sheet of metal. The thickness of the metal of the St. Louis helmet, including the bowl, varies from area to area, ranging from .75 to 1.6 millimeter. The metal must have been specially forged to minimize the weight. It is evident that this helmet was not to have been protective, but primarily decorative. In comparison, other helmets of this period are of an over-all greater thickness.

The St. Louis helmet was hammered from one sheet of metal, like the helmet and crestander of the "Warrior" (45.11.7) in the Metropolitan Museum of Art. Careful examination of the inner and outer surfaces revealed no seams or soldering. In contrast with the production of sheet metal in our times by rolling mills, it took extraordinary skill and labor by the ancient smelter to forge, for the purpose of hammering out a helmet of this form and dimension, a sheet of bronze metal about thirty-five inches in diameter. It is known that sheets of this size were produced for hollow ware and armor, particularly for shields, breast- and back-plates. In contrast to these flat or slightly formed objects, the metal and the hammered sheet for the St. Louis helmet must have been of exceptionally good and flawless quality in order to yield the elaborate form which was projected. One cannot know how many sheets the creator had to discard before arriving at the perfect specimen.

**I**N EVERY ASPECT the caliber of work of the St. Louis helmet points to a master of the highest skill. One is led to assume that the sculptor-armorer of this hel-

met was in fact a master of many skills, since there seems to be no trace of an assistant's hand. He has

actually chosen a technique in which he could be independent of any artist of affiliated crafts. Had the whole or part of the helmet (and by part, I mean the ram's head) been cast, the process of making the helmet would perhaps have been divided among several assisting artisans of various specializations: the sculptor to model the ram's head; the caster to cast the model; the armorer or bronzesmith to hammer the bowl; and the chaser, or engraver, to rework the cast and to add the repoussé work on horns, cheekplates, etc., and the engravings. It is, of course, possible that the creating artist headed a workshop of many specialists who participated in this project, but essentially this appears to be the work of one hand.

In the light of what is known about hand metalsmithing, it is possible to follow the ancient metalworker step by step in the construction of this helmet. He began with hammering-out and completely forming the ram's

head, continued with the neck, then proceeded to the shaping of the skullbowl into the desired form and length of the complete helmet including cheekpieces.

When the general form was achieved, the detailed repoussé work provided the finishing decoration. Actually, the hammering-out was a twofold process: ham-



Fig. 2. Left profile of the restored helmet.



Fig. 3. Stater of Metapontum, ca. 510-480 B.C., in the Lloyd Collection of the British Museum. Other examples are shown by Sydney P. Noe, *The Coinage of Metapontum* (New York, 1927-31), especially Part One, figures 221-228.

*Photo: Courtesy of the American Numismatic Society*

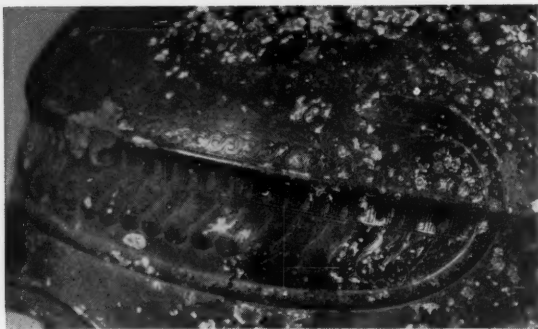


Fig. 4. Detail of the left side of the archaic helmet before cleaning. The fine craftsmanship appears in the delicate repoussé decoration, in the stylized curls of hair, and in the imaginative serpent's head.

mering on the outside to create the form, and on the inside to raise the details. Hammering was probably done on a log of wood used as a stake, with a mushroom-headed top shaped according to the immediate need of the object. On this the worker drove the metal to the form of his design. When this raw form was completed the surface was smoothed out, no longer on a wood block but on a harder metal, perhaps even steel, stake. For the delicate repoussé work, however, the form was filled out with pitch, hard and supple enough so that all the finest tracings and modelings could be indented with a wide variety of punches, thus producing detail while the established form remained unaffected. The Metropolitan Museum has a statuette (42.11.42) of an armorer hammering in just this way.

The horns and ears of the ram's head were made separately and soldered on. The ornamental rams' heads in relief were chased separately and riveted onto the cheekpieces which are a continuation of the helmet metal. This was done presumably to strengthen the cheekpieces and to have a smooth metal surface on the inner side. The eyes for the ram's head and for the cheek repoussés were set into their sockets where a thin bronze pin had been riveted from the inside to hold each eye in place. One may guess that these eyes were originally made of painted or inlaid ivory, of semiprecious stones, or of glass paste in different hues. The series of pinholes along the border of the bowl and the cheekpieces suggests the use of an inner cushioning—and perhaps a silver trim.

AFTER CENTURIES in the soil of South Italy, the helmet was excavated. After many years of travel, it was purchased by the City Art Museum of St. Louis in

1949. With it were a variety of metal fragments, whose purpose and relation were not immediately apparent. Mr. PERRY T. RATHBONE, Director, and Dr. THOMAS T. HOOPES, Curator of the City Art Museum, who made an extensive preliminary study of the helmet and these fragments, were able to distinguish some of them as silver, with the shape of one suggesting a crest belonging to this helmet. In its damaged and diseased state, accompanied by these fragments, the helmet was entrusted to me for restoration and reconstruction. Utilizing the research of Mr. RATHBONE and Dr. HOOPES, I have accomplished the entire reconstruction of the helmet, step by step, with their understanding and approval. I am deeply indebted to them for the trust placed in me and for the opportunity to work on this object. The challenge was manifold



Fig. 5. The helmet before cleaning, showing (a) filling in the corroded hole in the ram's head, and (b) eye-socket of the cheekpiece with hole for the rivet.

and constant; throughout, it was my purpose to maintain the conception of the artist and his time, as far as it could be learned from available clues.

The condition of the helmet was very poor (FIGURE 4). Almost the entire surface had been attacked by an active, corrosive, metal disease. Sections were completely missing through corrosion, and holes of various sizes were eaten away. My first tasks were to stop this active process and to remove the incrustation and the recently cemented filling in a hole on the ram's head (FIGURE 5, a). Without touching the surface, I painstakingly chipped away the incrustation with bronze tools, and the thinner films I lifted away with ivory tools. None of the original surface was in any way damaged, nor were fresh tool marks produced. The actively diseased centers of partially powdered



Fig. 6. Detail of ram's head after cleaning, with (a and b) the marks and solder remnants of the missing ears and horns.

THE ROLE OF SCIENCE in archaeology today is too well known to require extensive comment. A knowledge of the constituents of a bronze alloy may shed light on ancient commercial relations, mining operations, and many other problems. In addition to a chemical analysis of the bronze of the helmet, Lucius Pitkin, Inc. of New York, metallurgical chemists and consultants, submitted the following qualitative spectrographic analysis:

Copper	Major	Silicon	O.OX low
Tin	Major	Aluminum	O.OOX
Iron	O.X low	Nickel	O.OOX
Lead	O.X low	Silver	O.OOX
Antimony	O.X low	Bismuth	O.OOOX
Arsenic	O.X		

Elements checked but not found: Chromium, Cobalt, Molybdenum, Vanadium, Manganese, Tungsten, Zinc, Cadmium, Indium, Phosphorus, Titanium, Magnesium.

(Major—above 5% estimated; .X, .OX, .OOX, etc.—concentration of the elements estimated to the nearest decimal place, e.g., .OX = .01-.09% estimated.)

verdigris were thoroughly cleaned, washed out with distilled water, carefully dried, and kept under observation for several months for recurrence of disease. The incrustation consisted chiefly of a thin, light and dark brown layer of copper oxide, a brittle, uneven green film, and scattered warts and clumps. Most of the warts hid active disease areas which, after removal, left the metal pitted in many places. It can be assumed that all the exposed disease areas had previously been covered by warts which in the course of time had become loosened by the disintegration of the metal underneath. The inner surface was covered with a healthy, predominantly dark green and brown layer of a thicker incrustation, which I have left untouched since there was no reason to do otherwise. I had also to stop the active process on the irregular inner border areas

where corrosion had eaten extensively and deeply.

On the few places where the corrosion had not covered the polished metal and where thick oxidation had not penetrated the original color, the bronze had a beautiful, rich, golden color. After removal of the incrustation and cleaning, this original color was regained almost all over, with darker and lighter shadings. The beauty of this metal, often seen in forged objects of this period, is such that it is frequently mistaken for a gilded bronze.

Chemical analysis of the metal found that the alloy consisted of 84.42% copper and 14.88% tin. The normal red copper color changes from a dark bronze to a light golden bronze color through the addition of another metal, such as tin, in amounts varying from 10% to 15%. Besides the beautiful color, the copper acquires through the alloying several important properties: great strength, high resiliency, good malleability, and corrosion-resistance. To replace the horns, ears, and nasal piece, I have used bronze sheet metal of color and alloy-percentage matching the original. The most similar alloy available is the so-called "red brass" produced by the Chase Brass and Copper Company of Waterbury, Connecticut. Its composition, however, is 85% copper and 15% zinc, not tin.

The cleaned frame of the helmet then revealed more clearly all the relief work and engravings. A distinct, dark line along the median line of the back of the ram's neck and bowl came to light. This was evidently caused by a crest running along this length. The marks

of the missing ears and horns with solder remnants still attached became easily discernible (FIGURE 6, a and b). The eye sockets in the ram's head still had the pins sticking out; on the cheekpieces, the eye socket on the left was partially destroyed, but on the right side there was a hole where the riveted pin had fallen out (FIGURE 5, b).

**I**N AN EFFORT to find the missing parts of the helmet, an exhaustive search was made among the various fragments that had accompanied it. In the process of sorting, they fell into two groups: the silver fragments already identified as parts of the crest, and bronze pieces in differing shapes. The latter proved to be portions of a suit of armor and a large shield, the latter now reassembled on a wooden core.

The silver pieces consisted of one large, inverted, roughly L-shaped piece and nine smaller fragments. Now began the complex and vexing job of fitting this

puzzle together, to find how the fragments were related to each other. I could place all the fragments along their definite lines of breakage from the larger piece, with the exception of two. The position of these eluded me for a long period as they could not be related by breakage lines anywhere along the main outline. Since these two pieces seemed in no way to fit, the only remaining possibility was to use the ornamental design and the indicated shape of the whole as guides. The flat silver fragments showed definite raised lines of decoration running in curves. One formed the outer rim for the entire extent of the projected crest; there were as well parallel short and curved lines suggesting a distinct shape for the crest. Fortunately, the fragments that belonged together suggested the larger part of the shape of the crest with a fair degree of accuracy. Following the layout, it was possible to add new silver parts to complete the whole.

An additional clue lay in the fact that (after the removal of oxidation) one side of the silver pieces was highly polished, indicating an outer side, and the other was unpolished, with a thicker film of incrustation. All the chased lines fitted into a continuous pattern, except on one fragment (considered one because it consisted of two perfectly matching parts) where the raised lines seemed at first to be on the wrong side. This led to the conclusion that the crest was built of double sheets of silver and that, of the complementary side, only this fragment remained. From the design suggested by the fragments it was possible to reconstruct the whole crest, fitting into their respective places in the complete design the hitherto unaccountable two pieces (FIGURE 7).

The thickness of the original silver was between three and four-tenths of a millimeter, and the length of the reconstructed crest was twenty-one inches from the tip to the highest point. I proceeded then to replace all the missing portions of the crest from sheet silver. It should be noted that a few of the silver fragments were very thickly corroded. In order not to endanger or destroy the existing cleavage lines still visible, it was decided, after consultation with Mr. RATHBONE and Dr. HOOPES, that it was more advisable for scholarly interests to preserve these without attempting their cleaning. This accounts for their unpolished and corroded appearance in contrast to the remaining original and new silver.

Along the border of the large silver fragment was

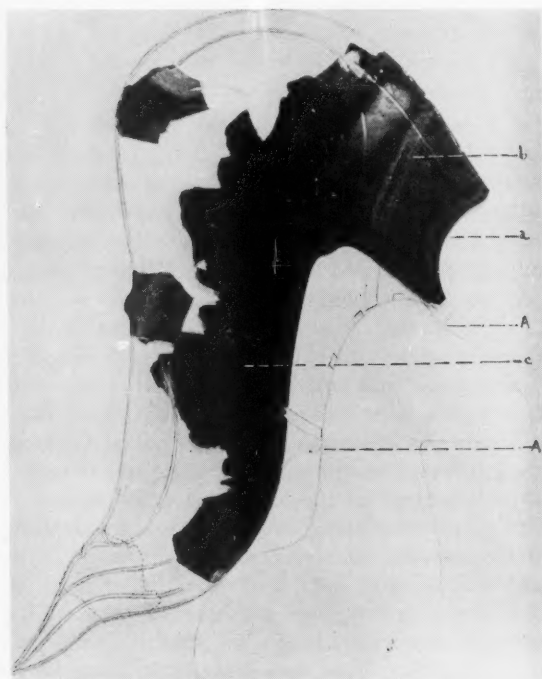


Fig. 7. The silver crest fragments placed on a drawing to show the method of reconstruction. Dotted lines mark the position of the two-piece fragment on the left side. The stripes of discoloration (a, b, and c) indicated the bands originally used for mounting the crest. The interstice (A to A) suggested the shape of the restored ivory crestholder.

All illustrations except figure 3 are by courtesy of the City Art Museum, St. Louis.

a line of pinholes and some remaining rivets, indicating that the two sheets had been mounted on a supporting material, possibly leather. We decided, however, to replace this with a sheet of plastic, selected because of its durability, corresponding exactly to the shape of the crest by varying in thickness from one-quarter inch at the outer rim to a very fine, almost knife-sharp edge at the inner line. On each side, the silver was pasted to a sheet of linen canvas to give an even backing and additional support.

Fig. 8. (Left) A sixth-century Greek helmet deposited at the City Art Museum, St. Louis. This profile shows one lug to hold a crest; two rivet holes on top, not visible here, are for additional lugs.



Fig. 9. (Right) The restored ears and horns are attached to one of the plates shaped to lap over the corrosion hole in the ram's head and clamped in place by two screws. This restoration required no further mutilation of the original bronze.



WITH THE COMPLETION of the two silver sheets came the problem of mounting the crest on the helmet. Here again very definite leads were provided by the three stripes of discoloration bordered by rivet holes which were preserved where, fortunately, the silver was almost completely intact (FIGURE 7, a, b, c). These indicated that bands must have been used for mounting the crest. Surely these were of silver since the few remaining rivets were also silver. In bringing the crest into the proper position on the helmet, a gap became apparent between the inverted L-shape of the crest and the helmet. This gap must have been the space occupied by the crestholder fastened directly to the helmet. The assumption of a crestholder is founded on the evidence of examples shown on documentary sources, such as contemporary stone reliefs and vase paintings.

There was, of course, no trace of the material of which this crestholder had been constructed. Ivory seemed to be the material most in keeping with the

character of the helmet. From literary testimony, too, it is known that ivory was frequently used in combination with silver and gold in ancient Greece. I formed the crestholder to follow the contour of the ram's head exactly from the outer end of the crest marked by the first band to just below the third band (FIGURE 7, a to c). I left just enough margin between the ram's head and the ivory so that the silhouette of the ram's head from the top down to the elongated neck of the ram should suffer no distraction.

The concave line of the upper crest is to be visualized as leading inward to the line of the lower edge of the crestholder (FIGURE 7, A to A). In principle this again follows the evidence to be found on designs of other helmets of the period and seems artistically valid. The three bands spanning the crest were arranged in this relationship to achieve maximum security in a balanced mounting for the weight and shape of such a crest; the one on the edge serves also as the closing of the crest while the other two served as clamps only. I screwed the bands into the original holes with overlapping ends screwed to the ivory crestholder. Although these parts had originally been riveted together, I substituted screws to make detachment easy. The inner rim of the crest was set slightly into a finely filed groove which I made in the ivory, as I assumed that the beveled edges of the silver meant that the crest had been so affixed in order to rest securely.

For the next step in fastening the crest structure to

the ram's head, I utilized the existent large hole in the upper right part of the ram's head. This enabled me to devise a scheme for mounting the crest that was in keeping with the City Art Museum's objective that none of the reconstruction be permanently attached to the original helmet. For historical purposes and for future scholarship, it was intended to make a reconstruction that could be readily dismantled to the original state of the helmet.

This cranial hole was caused by a combination of factors: severe corrosion hastened by the accumulation of moisture and so producing different chemical agents which were brought into play in this area; the weakening of the riveting; and the weight of the crest. Careful examination of the indentations outlining this hole suggested the places where the lugs holding the crest must originally have been riveted. Examples of such lugs and rivet holes exist on other Greek helmets of this period, used by us as documentary proof (FIGURE 8).

To fasten the crest, I closed the hole with a piece of bronze following exactly the outline of the space, with an overlapping beveled edge resting on the breakage border so that this covering metal would be held in place. I hammered a second piece of bronze, larger but otherwise a duplicate of the first, and this I placed inside in a corresponding position. Thus the gap was filled by a sheet of metal and reinforced by a second, wider piece. I then fastened two of the lug clamps which were to hold the ivory crestholder onto the upper plate covering the hole (FIGURE 9).

I replaced the missing horns and ears by hammering them out of bronze sheet metal, using the design on the cheek-repoussés as models. I soldered the two horns on a metal bridge, spacing them so that the horns would fit exactly where the old solder markings indicated they had been. On the bridge, I soldered the third lug in line with those on the upper plate. As the final step, I clamped together the upper plate to which I had affixed the right ear, and its counterpart under-

neath, by two screws (one of them concealed in the lug on the bridge). The left ear at its outer tip is contiguous with the horn, since no other possibility was available which would not deviate from the guiding principle. Into the U-shaped lugs the crestholder was set securely and fastened with pins so that it could easily be removed. Thus the complete dismounting of crest, ears, and horns can be done in a simple operation.

It was the preference of the Museum, for the present, not to replace all the broken or eaten away parts of the helmet but only to complete the original appearance so as to give the public a view of it in its original conception. Therefore, reconstruction of the damaged right portion of the skullbowl and neckpiece were omitted, and, similarly, a large hole directly above the right cheekpiece was left untouched. I have, however, replaced the missing nosepiece with the missing lower edge of the right brow; again the new part is fastened with two pins set into original rivet holes and thus readily detached. To maintain the realistic appearance they undoubtedly had originally, I carved eyes of ivory, chosen as the most appropriate material, set them in the ram's head and cheekpieces, and colored the pupils and irises naturalistically.

Many happy circumstances have combined to make reconstruction of this helmet possible. It was extremely fortunate that the excavation produced and saved so many silver fragments of the crest, in spite of the lack of immediate understanding of their meaning, and that these were never separated from the helmet itself. In the execution of this reconstruction, research provided authentication and support for even the minutest detail of the process. But, foremost, is the fact that the helmet came into the custody of a museum dedicated to high idealism in the service of art history and to the preservation of art, where the museum authorities had the scholarship, courage, and foresight to visualize the helmet in its original beauty.

#### NOTE

One may ask what served as the model for the graceful and majestic crest. The author sees in it the stylized representation of the horse mane in archaic Greek sculpture, and he makes a striking comparison in referring to the horse illustrated on plate 69 of JEAN CHARBONNEAUX, *Sculpture grecque archaïque*.

Ancient representations of crested helmets are numerous; outstanding are the pedimental sculptures of the Temple of Aphaia at Aegina; the central panel of the Etruscan chariot

in the Metropolitan Museum; the stele of "Athena Wearing a Helmet and Holding a Lance," Acropolis Museum; and the north relief of the Monument of Xanthos now in the British Museum.

For a more detailed discussion of this helmet, see THOMAS T. HOOPES, "A Superb Greek Helmet of the Sixth Century, B.C.," *Illustrated London News*, August 5, 1950, and the same author's article in the forthcoming volume of studies in honor of DAVID MOORE ROBINSON.

# CHICAGO'S DIORAMAS

THE RECENT REOPENING OF THE Frederick J. V. Skiff Hall (Hall 37) marked the completion of a three-year undertaking at the Chicago Natural History Museum. The presentation of fossil plant and invertebrate animal life has been entirely reorganized. The hall is now, in effect, completely new, with old methods of display discarded in favor of a series of bright, colorful, and dramatic exhibits which present the story of millions of years of prehistoric life in an easily followed continuity (see *ARCHAEOLOGY* 4 [1951] 71-75).

Outstanding are the many dioramas in which the weird creatures of a dim epoch are recreated three-dimensionally amid restorations of scenes of the primeval earth on which they lived. The illustration shows one of the ten habitat groups made by sculptor GEORGE MARCHAND.

This diorama represents, in natural size, some of the 345 species of animals known to have lived in the Gulf of Mexico late in the Cretaceous period, 100 million years ago. At that time, the Gulf extended up the Mississippi Valley into southern Illinois. Fossil shells of the animals represented and of many others have been collected from clay deposited in the ancient Gulf and now exposed in the banks of Coon Creek, in western Tennessee. EUGENE S. RICHARDSON, JR., and GEORGE LANGFORD, Curators, visited that locality two years ago to collect shells for the restoration.

This group illustrates particularly well the ceaseless feeding activity at the bottom of the sea, based on plants as the fundamental food. Clams and oysters eat microscopic plants and microscopic animals that have eaten even smaller plants; snails eat the same plus seaweed, clams, and oysters; and large ammonites with grasping tentacles capture all three kinds of slower

shellfish. These in turn must die, providing nourishment for more plants and perpetuating the cycle.

IN MAKING A restoration, the artist starts with only the shells or other hard portions of the animals. To supply the soft fleshy parts of an extinct animal, he must study the appearance of related living forms. The color of the models is necessarily imaginary, for color is almost never preserved in a fossil. But by a process of logic it is made similar to that of living representatives of the same group, and is chosen to blend or contrast pleasingly with the rest of the exhibit.

Seaweeds are present in most of the groups, though they are generally not recognizable in collections of fossils, where they are represented by rather shapeless black marks. In the group shown, Mr. MARCHAND has used his artistic license to produce a dramatic seaweed giving a strong dynamic effect to the whole composition. It is a proper accessory for the slender ammonites swooping greedily upon the sluggish mollusks below.



*Photo: Chicago Natural History Museum*



Fig. 1. Limestone fragment from Middle Kingdom mortuary temple of King Neb-hepet-Re Mentu-hotpe at Deir el-Bahari, in Royal Ontario Museum of Archaeology.

# AN EGYPTIAN BATTLE-AXE

By Winifred Needler

*Curator of the Near Eastern Department, Royal Ontario Museum of Archaeology*

ONE OF THE BEST WAYS TO UNDERSTAND HOW an ancient object was used and how it looked when it was new is to view it through the eyes of its contemporaries. On the other hand, a surviving specimen frequently furnishes additional information about an object shown in ancient pictures and sculptures and sometimes checks the accuracy of the ancient artist's description. The two museum pieces described here are a good illustration of the way in which an object and a picture of it can help to explain each other. This is a procedure commonly followed by archaeologists, particularly in Egypt, and full of interest for the amateur.

The object of our comparison is a battle-axe typical of the Egyptian Middle Kingdom (about 2065-1785 B.C.). The form appears in the wall pictures of tombs

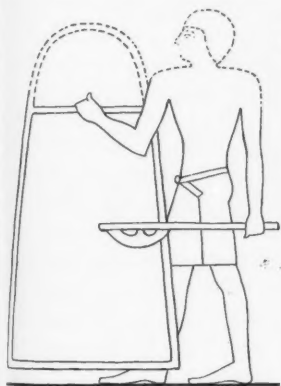
and in the painted interior decoration of certain coffins, and actual specimens of it have frequently been found. Placed side by side, our two pieces cooperate to give the average museum visitor the pleasure of being instructed by the ancients themselves. To the visiting specialist the comparison is remarkable because it concerns two actual pieces, whereas he must usually be satisfied with studying one, if not both, from photographs. Both the actual axe and the picture are included in an exhibit of ancient Egyptian weapons in the permanent collections of the Royal Ontario Museum, Toronto.

The soldier (FIGURE 1) is a limestone fragment from the sculptured and painted walls of the ruined mortuary temple of King Neb-hepet-Re Mentu-hotpe at Deir el-Bahari. These murals included battle scenes

representing the little-known wars of the king against nomadic peoples on the fringes of the Delta, after his victorious armies had united Egypt under the Theban Eleventh Dynasty, about 2065 B.C. Our soldier, however, probably belonged to one of the more peaceful scenes in the colonnade around the pyramid hall. His bearing is formal, and he is carefully portrayed. He is most likely a member of the royal bodyguard in a festival procession or a personal attendant of the king, perhaps of high rank. In the nomarchs' tombs of the succeeding dynasty, the illustrious owners are frequently attended by henchmen carrying similar battle-axes and shields, and sometimes bearing the names of high officials.

FOR FULL APPRECIATION of the resemblance between our soldier and the type represented in the Twelfth Dynasty murals it is necessary to observe his large shield. It is covered with ox-hide stretched on a wooden frame; it curves in to an upper edge that was probably rounded but may have been pointed (both variants were used during the period), and it expands slightly to a flat lower edge. The cross bar serving as a handle was usually placed about twice as far from the bottom as from the top, so that the shield was probably not a great deal shorter than its owner. According to the tomb pictures, shields of the same shape varied in size from about the height of a man to about half that height. In a fishing and fowling scene in the Twelfth Dynasty tomb of Djehuti-hotpe at El-Bersheh the axe and shield carried by one of the nomarch's noble attendants (FIGURE 2) are identical to those in

Fig. 2. Noble attendant in tomb of Djehuti-hotpe, Twelfth Dynasty. After Griffith and Newberry, *El Bersheh*, I, plate 20.



our picture. The fact that armed attendants figure even in such peaceful scenes is a vestige of the civil wars from which Neb-hepet-Re had emerged victorious.

Eleventh Dynasty pictures showing the type of axe represented in these Twelfth Dynasty pictures are much rarer. The fragment in Toronto (FIGURE 1) and an unpublished fragment mentioned below (FIGURE 4d) are the only such repre-

Fig. 3. Egyptian battle-axe of the Middle Kingdom, now in the Royal Ontario Museum of Archaeology.

sentations from Neb-hepet-Re's mortuary temple known to us. (Several fragments from the temple show soldiers carrying an inferior and quite different form, similar to the carpenter's axe of that day.) An axe like ours is figured in the tomb of Neb-hepet-Re's chancellor Khety; it is placed among the great man's pictured equipment. The names of Khety and of other courtiers occur a few times in the fragments from Neb-hepet-Re's temple. Some time more definite information about our soldier, perhaps even his name, may be gathered from fragments that were once part of his immediate surroundings. For anyone interested in comparing him with the scattered unpublished fragments from the same temple this measurement will give the scale: the distance from his eyebrow to his chin is  $1\frac{7}{8}$  inches.

Our battle-axe has two openings, or "scallops," which formed three curved projections at the back and which were designed to lighten the weapon. It was probably derived from a similar battle-axe that was well known in West Asia. The northern type, however, was deeper and was socketed to receive the shaft. The shallow Egyptian form was closely related to another typically Egyptian weapon of the same period: a wooden club reinforced with a long narrow blade. The Egyptian scalloped battle-axe was practically unknown during the Old Kingdom and is not shown in use in New Kingdom art; it was then superseded by an axe of entirely different form.



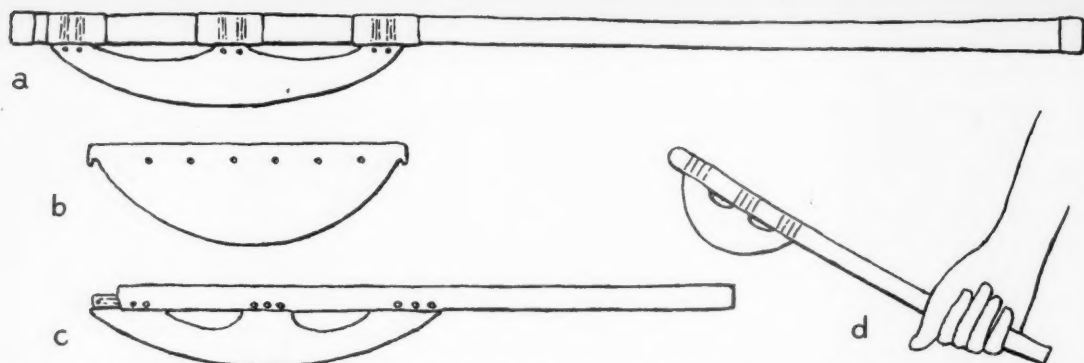


Fig. 4. A group of Middle Kingdom axes: (a) after Garstang, *Burial Customs of Ancient Egypt*, figure 165; (b) after Petrie, *Diaspolis Parva*, plate 32; (c) after *Archaeologia*, 53, plate 3; (d) after a photo in Royal Ontario Museum of Archaeology.

THE ACTUAL SPECIMEN (FIGURE 3) has a blade about 6 inches long. The copper tube, consisting of five separate ferrules, was designed to strengthen the wooden shaft (now missing). The tube was closed at each end of the shaft, which was considerably longer than the present length of the tube. There are no rivets or rivet-holes. The copper blade was inserted into slits in the tube and lashed to it through thirteen perforations and over a small turned-down lug at each end. The photograph shows the modern wire with which the tube is secured to the blade; below this wire the marks left on the metal by the original lashing are clearly preserved. This axe is of unknown provenance. We cannot be sure that it was exactly contemporary with Neb-hepet-Re, but it cannot have been much earlier or later.

Although a few axes have been found with tubes or ferrules like ours, the shafts that they once enclosed are rarely found with them. A scalloped axe (perhaps Eleventh Dynasty), from the Middle Kingdom cemetery at Beni Hasan, was excavated with its original shaft intact and with ferrules at the three points of contact (FIGURE 4a). It was hafted like ours. The excavator reported that there was no sign of riveting. Shallow axes similar to this Beni Hasan specimen and to ours, but without the two scallops in the blade, have frequently been found (FIGURE 4b). They are provided with a continuous row of holes for lashing and with small turned-down lugs, and some have been found with metal tubes like ours. This type of axe went out of fashion before the Twelfth Dynasty.

Battle-axes of the period, however, were not always attached to their handles in this way. PETRIE found an axe with its original wooden shaft, showing that it

could be lashed without metal ferrules, since the shaft has distinct lashing marks. (*Gizeh and Rifeh*, plates 12 and 13). Sometimes, moreover, the axes were riveted, as was proved by the finding of actual rivets in the holes of blades. FIGURE 4c shows an axe in the British Museum that is fastened with rivets to a metal tube. These riveted axes are without lugs. The two methods of attaching the scalloped axe, i.e. lashing and riveting, were used concurrently during the Middle Kingdom. Since blades without lugs—and therefore designed for riveting—have been dated most frequently to the Twelfth Dynasty, and since the method of lashing through a series of holes and over lugs and ferrules was established long before that time, the riveted form may have been the later development.

THE AXE IN OUR relief sculpture shows no trace of lashing, ferrule, or rivet. An unpublished fragment from the same temple contains a similar scalloped axe (FIGURE 4d); its shaft clearly has lashings at the three points of contact. Similar lashings appear on many of the scalloped axes in the Twelfth Dynasty tomb pictures and, with greater detail, in rare representations of such axes in the inventories painted on coffins of the same period. Since riveted battle-axes were known at least as early as the Eleventh Dynasty and since battle-axes are shown in the ancient pictures both with and without lashing marks, the interpretation of this single point in our picture must be left, for the present at least, to the reader. Having in mind, however, the high quality of the fragment and the Egyptians' usual love of detail, we prefer to think that the lashings were omitted purposely, to show that the axe was inserted into the handle and riveted.

# WHEN ROMANS WENT SHOPPING

By Dorothy Kent Hill

*Curator of Ancient Art  
The Walters Art Gallery*

**W**EIGHING INSTRUMENTS BASED on the principle of the lever are as old as Roman times. In fact, the common instrument for market purposes under the Roman Empire was a steelyard (made of bronze!) which for practical convenience surpassed our own.

The steelyard illustrated by the photograph in FIGURE 1 and the drawings of FIGURE 2 is in the Walters Art Gallery in Baltimore, being one of many in museums around the world. It is just as it was when used in a Roman market except that it has turned green and has lost one of its hooks. Perhaps even this damage is ancient; the hook may have broken when too heavy a burden was being weighed. We do not know the source of this steelyard, but since it came to Baltimore through a collection in Rome it is reasonable to suppose that it was excavated near Rome, though others just like it have been found all over the ancient Roman world: in Britain, France (Gaul), Syria, Asia Minor and Egypt.

The date, too, is uncertain. Steelyards of quite different appearance applying the same physical principle were fashionable when Pompeii was an active center, and I therefore imagine that the Walters type does not date from the period before the volcanic eruption of A.D. 79. Provisionally, I should date it somewhat later, say anywhere from the second through the fourth centuries of our era.

The steelyard is an application of the principle of the lever, one of the so-called simple machines. When a lever is in equilibrium, the two forces, the weight of the item and the weight of the counterpoise, are to each other inversely as the arms of the lever. To phrase it

differently, one might say that the item to be weighed, multiplied by its distance from the fulcrum, equals the weight of the counterpoise multiplied by its distance from the fulcrum.



$$ED = RD'$$

E is Effort (weight of counterpoise)

R is Resistance (weight of object)

D is Distance of counterpoise from fulcrum

D' is Distance of object from fulcrum

F is Fulcrum

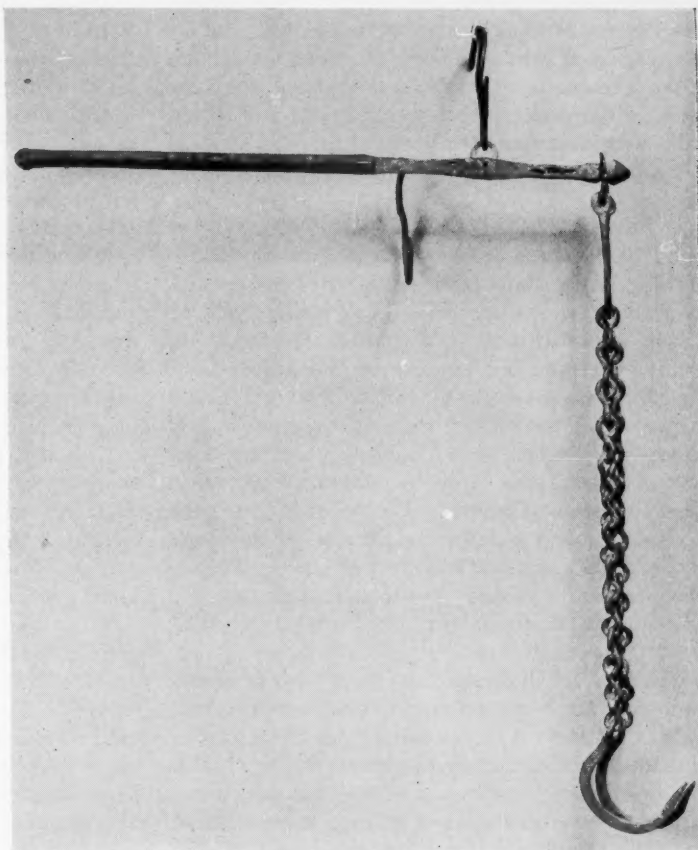


Fig. 1. Roman steelyard in the Walters Art Gallery.

Since D is variable, a counterpoise of fixed weight can be used to balance all weights. The arm of the lever on which the counterpoise shifts is marked with a scale indicating the weight of the objects which keep the lever in equilibrium; that is, the value of R. The Roman merchant with a steelyard, therefore, needed only a single counterpoise, while for the balance which had been in use under previous civilizations and which, with some improvements, persisted in use, a series of weights was required.

A DISTINCTLY ROMAN development in the use of the lever for weighing was multiple fulcra. Roman steelyards always offered a choice of two or even, as in this case, of three hooks for suspension with resulting radical changes in the relative lengths of the arms of the lever. The long arm, the arm on which the counterpoise moved, was graduated on several faces to correspond to the various hooks. With an instrument so easily adjustable it was possible to weigh very light or very heavy objects. A single counterpoise was calculated for use in all positions. The steelyard now in use (called a "cotton scale" in certain parts of this country) requires a light and a heavy counterpoise. The Roman steelyard was easily portable. Probably many a wise Roman carried his own tested steelyard on business trips in self defense.

The steelyard illustrated consists of a bar of bronze 14 inches long. Next to a terminal knob which is at the right in FIGURE 1 there is a collar from which hangs a U-shaped piece supporting two chains and two hooks. On these hooks the objects to be weighed were hung; they must have been sacks or perhaps joints of meat, not loose small items for which there existed other steelyards provided with hanging pans. Three other hooks provided means for suspending the instrument; these are at A, B and C in FIGURE 2, and one of them, the one formerly attached at C, is broken off. The hook attachments, the fulcra, are  $1\frac{1}{4}$ ,  $2\frac{3}{4}$ , and  $4\frac{3}{4}$  inches, respectively, from the collar. These hooks were attached in the following manner. There are three long, deep grooves running lengthwise of the shaft and across each groove at the center a thin rod was set as an axle. A small ring encircles the axle and the hook is attached to the ring. The axle is the fulcrum.

The long arm of the lever is square in cross section, diminishing slightly toward the outer end, and three of its faces are graduated. The merchant suspended the steelyard by the appropriate hook, attached his burden to the hooks on the chains, then moved the counterpoise, which hung on a wire encircling the shaft, back

and forth until equilibrium was achieved. The weight of the objects was now indicated by the position of the counterpoise *on the correct scale*.

For the scale to be legible, the steelyard would have to be hung with the suspension chains at the right and the numbers mounting toward the left. The relation of hooks to the square shaft is such that the scale in use is neither horizontal nor vertical, but slopes at an angle of  $45^\circ$ . Suspended near eye level, the slanting surface would be easy to see. Other scales might be visible, but could not be used. The collar rotates on the shaft and permits the chains to hang freely.

When the steelyard was suspended by the hook which is nearest the center of the whole instrument and which is attached at fulcrum A, scale 1 was uppermost (see FIGURE 2). The counterpoise moved along a face divided by lines into sections about an inch long, each representing one pound. The limits are marked by long lines, the half pounds by shorter lines, and each twelfth of a pound, or ounce, is indicated by a very short stroke. The letter V (Roman numeral for 5) is engraved over the five-pound mark. The total to be weighed on this scale with the use of this hook is eight pounds. Toward the outer end, the graduations are pretty generally obliterated.

When the steelyard is suspended as in FIGURE 1 and the middle drawing of FIGURE 2, by the central of the three hooks, that attached at fulcrum B, the readings on 2, the scale now uppermost, began slightly under five, which is indicated by V. An X (Roman for 10) is visible farther along the scale at the ten-pound point. The V to indicate fifteen units is barely legible. The maximum weighable on this scale is seventeen pounds. Again, each pound is divided into half pounds. The smallest graduations are so indistinct that it is impossible to count them. In the drawing we have indicated only a few of these smallest graduations.

For weighing still heavier items the steelyard was suspended by the hook now destroyed, the one which was nearest the suspension chains and which was attached at fulcrum C. The scale (3 in FIGURE 2) reads from twenty to forty-seven pounds, with the whole and half pounds indicated and the letters XX, V, X, V, X and V being clear. This scale is the most legible of the three.

THE WEIGHT of the lost ancient counterpoise can be calculated from the three scales. For position B, one applies the simple equation given above, since the steelyard is then balanced at its center of gravity and its weight may therefore be neglected. First, we choose

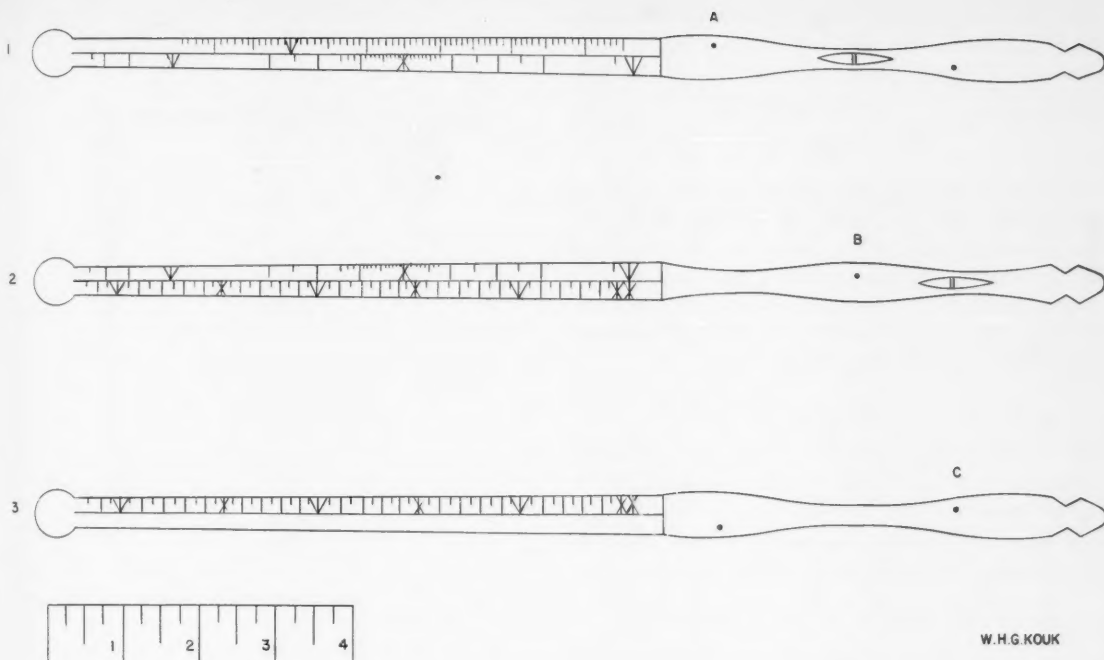
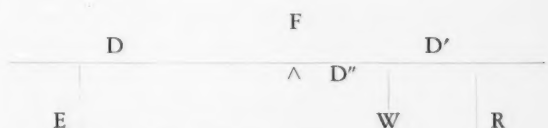


Fig. 2. The three scales of the steelyard in the Walters Art Gallery.

lever arms of equal length, using the distance from fulcrum to collar as the unit of measurement. The distance from fulcrum B to the collar is  $2\frac{3}{4}$  inches; measuring  $2\frac{3}{4}$  inches from fulcrum B in the other direction, one reaches a point just below the beginning of the scale, at approximately four and a half Roman pounds. The equation is written:  $E \times 1 = 4\frac{1}{2} \times 1$ ; or, using measurements in inches,  $E \times 2\frac{3}{4} = 4\frac{1}{2} \times 2\frac{3}{4}$ . E therefore is  $4\frac{1}{2}$ . As a test, we may choose arbitrarily any point on the scale, measure its distance from the fulcrum as D and use its reading as R. Choosing the mark for nine pounds, we measure its distance from the fulcrum as  $5\frac{1}{2}$  inches. Therefore  $E \times 5\frac{1}{2} = 9 \times 2\frac{3}{4}$ , and E again equals  $4\frac{1}{2}$ .

To calculate the weight of the counterpoise for the other two scales one must make allowance for the weight of the instrument itself. If such allowance is made, the results for all three scales are close enough together to prove that a single counterpoise was used. The principle here involved is that the weight of the instrument is concentrated at the center of gravity as if it were an auxiliary weight suspended at B. The following diagram is used for the A position:



W = weight of steelyard

D'' = distance of fulcrum from center of gravity

The equation for position 1 is:

$$ED = RD' + WD''$$

The weight of the steelyard (W) is one pound two ounces, avoirdupois, which is about one and a half Roman pounds. Fulcrum A is 2 inches from the center of gravity (at fulcrum B). We choose arbitrarily the mark for two pounds on the A scale and measure its distance from fulcrum A as  $2\frac{3}{4}$  inches. Substituting these values in the equation we get:

$$E (2\frac{3}{4}) = (2) (4\frac{3}{4}) + (1\frac{1}{2}) (2)$$

Solving the equation we get a value for E slightly over four and a half, actually 4.54.

As for scale 3, the equation is the same, except that

the corrective factor for the weight of the instrument must be added to the other side of the equation, since the center of gravity and the effort are on the same side of the fulcrum. The equation reads:

$$ED + WD'' = RD'$$

The distance between the fulcrum and the center of gravity ( $D''$ ) is  $1\frac{1}{2}$  inches; the distance of the fulcrum from the collar is  $1\frac{1}{4}$  inches and the weight of the instrument remains one and a half pounds. We choose the mark for twenty-five pounds and measure its distance from fulcrum C as 6 inches. Substituting these values in the equation we get:

$$E(6) + (1\frac{1}{2})(1\frac{1}{2}) = 25(1\frac{1}{4})$$

The solution of the equation is a value of  $4\frac{5}{6}$  for E.

Finally, on the same scale we select the mark for the highest even amount, forty-six pounds. Its distance from the fulcrum A is  $11\frac{5}{8}$  inches. We substitute in the same equation and get the equation:

$$E(11\frac{5}{8}) + (1\frac{1}{2})(1\frac{1}{2}) = 46(1\frac{1}{4})$$

Solving this equation, we get a value for E in excess of  $4\frac{3}{4}$ .

The range in value for E which results from these calculations is not great. A single counterpoise weighing somewhat over four and a half Roman pounds would weigh with reasonable accuracy at all points on all scales. The Roman's errors in marking the scales are probably not much greater than my errors of measuring. The fact that such inaccuracies exist indicates that the manufacturer tested his instrument empirically and did not make his marks by measurement and mathematical calculations.

AS A CHECK I tried making a counterpoise. The best results were obtained with one weighing three and three-eighths pounds avoirdupois, that is, a little over four and a half Roman pounds. With it I weighed various amounts between one and ten Roman pounds, taking the Roman pound at three-quarters of the pound avoirdupois. All the weighings were satisfactory, and a check was made by weighing a five-pound item on scales 1 and 2 with the same counterpoise. It was impossible to test the counterpoise on scale 3 because of the broken hook, and, indeed, the instrument seemed unequal to bearing loads of more than twenty pounds.

Amounts up to forty-seven Roman pounds, except for amounts between seventeen and twenty pounds,



Photo: Metropolitan Museum

Fig. 3. Roman steelyard with weight. A very small additional weight was found with it. Said to come from Jebeil, Syria. Metropolitan Museum of Art.

could be weighed on this steelyard with the single counterpoise and amounts between five and eight pounds could be weighed on either of two scales. Neither the overlapping nor the gap is unusual for Roman weighing instruments which were constructed first and graduated afterwards (I assume this because no two have identical scales). Nevertheless, one wonders what the Roman owner did to remedy the inconvenient gap in the readings.

He could, if he chose, have had a second counterpoise, equal to the first, and hung it on the second scale at the point marked V on the B scale whenever he needed to increase the reading of this scale; in this position, it would add five pounds to any reading on the scale. Or, he might have had an auxiliary counterpoise of about one and a half Roman pounds to hang at the three-pound mark on scale 1, which would actually be in view when the steelyard was suspended by hook B. In this fixed position, the small weight would increase by three Roman pounds readings taken by moving the counterpoise on scale 2. Or, an auxiliary counterpoise of four and a half pounds could be hung on hook A while hook B was in use, raising that whole scale by the needed three pounds. Possibly, as our final proposition, the purchaser of a defective and cheap

steelyard hoped that he would never be called upon to weigh items between seventeen and twenty pounds.

THE COUNTERPOISE, WEIGHING something over four and a half Roman pounds—what did it look like? Was it plain and ugly, like the instrument itself and

like some counterpoises, or was it a work of art? Frequently the Romans let themselves go and gave free rein to their passion for decoration. Then they made statues, portraits, and other interesting things act as counterpoises. Some of these I hope to discuss some day, but that's another story.

#### NOTE

Our steelyard came from the Massarenti Collection in Rome and is mentioned in E. VAN ESBROECK and others, *Catalogue du Musée au Palais Accoramboni* 2 page 24, no. 130. For others of similar construction see: M. BIEBER, *Skulpturen und Bronzen in Cassel*, pages 83 f., no. 341, plate 50; British Museum, *Guide to the Exhibition Illustrating Greek and Roman Life*,<sup>2</sup> pages 152 ff., figure 170; G. M. A. RICHTER, *Greek, Roman and Etruscan Bronzes*, pages 445 f., no. 1720 (see FIGURE 3); *Proceedings of the Society of Antiquaries of London* second series 11 (1887) page 317 and plate; A. FURTWÄNGLER, *Olympia* 4 page 190, no. 1199, plate 67; F. KELLER, in *Archaeological Journal* 29 (1872) pages 342-344 and plate; R. ZAHN, in *Berliner Museen* 35 (1913) columns 3-5 and 9-10, figure 1; A. DE RIDDER, *Bronzes antiques du Louvre* 2 page 161, no. 3260, plate 114; W. DEONNA, *Délos*

18 pages 140 f., nos. 6723, 6724, plate 53, nos. 404, 405; G. F. GAMURRINI, in *Monumenti Antichi* 1 (1892) columns 157 ff. There is much that is confusing in these publications, and much important data has been omitted. I am not convinced that GAMURRINI's steelyard is Etruscan, using an Etruscan standard of weight.

There are many more steelyards of the type which I consider Pompeian. For an illustration, see British Museum, *Guide*, figure 171.

SÖKELAND, "Entwicklung der sogenannten römischen Schnellwage," in *Zeitschrift für Ethnologie* 42 (1910) pages 505 ff., figure 14, is concerned chiefly with a third type of steelyard which was common in Mediaeval times and which I think developed out of the type which I have discussed.

—D. K. H.

## The Society for the Promotion of Hellenic Studies (founded 1879)

## The Society for the Promotion of Roman Studies (founded 1910)

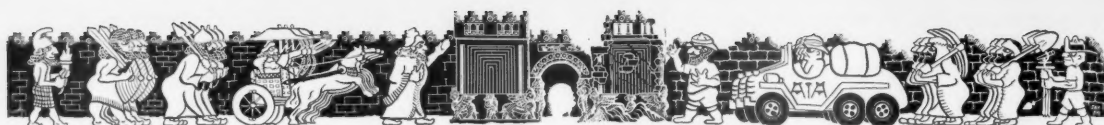
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# ARCHAEOLOGICAL NEWS

## Rome Assignment

From the "Class Notes" department of the March 14 issue of that perennial news source, the *Princeton Alumni Weekly*, we learn that the six-week summer session of the School of Classical Studies of the American Academy in Rome, in post-war years directed by HENRY T. ROWELL of The Johns Hopkins University or MASON HAMMOND of Harvard University, will be directed in 1952 by GEORGE DUCKWORTH, Classics professor at Princeton University, faithful member of the INSTITUTE, and undeviating supporter of the class of '24.

## Jericho

After a lapse of sixteen years, excavations were resumed on January 7 at Tell es Sultan, the site of ancient Jericho. The 1952 work is a joint undertaking of two institutions in Jerusalem, the American School of Oriental Research and the British School of Archaeology; the field director is Miss KATHLEEN KENVON. The twenty staff members are from Australia, Canada, England, Scotland, Wales, and the United States.

## Dead Sea Documents

Jerusalem papers have reported new discoveries of fragments of leather and papyrus, inscribed in Aramaic, Hebrew, and Greek, said to date from the second century A.D., made by Beduins in two vast caves near the Dead Sea. The Department of Antiquities of the Kingdom of Jordan, in collaboration with the French School and the Palestine Archaeological Museum, has taken charge of the clearance. The find has no connection with the now famous Dead Sea Scrolls found at Ain Feshka several years ago.

Two bronze scrolls have also been found in a Dead Sea cave by an international expedition which has located

and searched about forty caves. These scrolls have not yet been unrolled, but it is thought they may contain important Old Testament documents.

## The Chibcha of Colombia

When the first white men came to the New World they found two flourishing native civilizations in Central America—that of the Maya in southern Mexico and Guatemala and that of the Aztecs in Mexico. Trailing behind them by perhaps a couple of centuries of cultural evolution, and lost sight of in comparison, were the strange kingdoms of the Zipa and the Zaque of the Chibcha Indians of Colombia.

According to Dr. ALFRED L. KROEBER, professor of anthropology at the University of California, the Chibcha actually had moved some distance in the direction of civilization. They had evolved politically from tribal life to organized states. They were essentially on a level with the others in military organization, trade and political relations, religious concepts, and manual industries. But they developed no calendar and no astronomy. They did not build in stone, had no sculpture, and their art was decidedly second rate.

In the upper valleys of the Bogota and Sogamoso rivers were the capitals of the Chibcha kingdoms and the sacred cities, at 8,000 to 9,000 feet altitude. The kingdoms of both Zipa and Zaque, however, comprised much territory outside these valleys. The total range of Chibcha territory may have included about 6,000 square miles. The population at the time of the Spanish conquest has been estimated at about a million, but this figure may be too high, Dr. KROEBER believes. They were militaristic states and are described by Spanish chroniclers as fighting each other with armies of 50,000 or more soldiers.

Their towns were composed of houses with walls of mud-daubed cane,

with gabled or conical roofs, and sometimes with double walls. Palaces and towns were enclosed in palisades of cane between posts, with occasional "crow's-nests" on poles supposedly used as watchtowers. Markets were held every four days in the chief settlements, and there was quite extensive trade with Indians outside the Chibcha area. Cotton cloth, salt, and emeralds were given for gold which was needed for the handicrafts.

Although strong nobles were constantly rebelling so that the kingdoms lacked real permanence, both the Zipa and Zaque were extremely powerful rulers. Within their realms the rulers were shown every respect which native imagination could contrive. Even the most powerful subordinate chiefs never looked directly at their superiors. Spanish soldiers were considered shameless because they looked their own officers in the eyes on addressing them. An incorrigible thief was forced to look his ruler in the face and then turned loose—it was believed he had suffered a punishment worse than death.

Succession to the rule was through the mother. The "crown prince" had a hard apprenticeship for his exalted role as he was confined for six years in a temple, forbidden to see the sun, and allowed out only at night. Occasionally he was whipped. Even harder was the apprenticeship of a priest of the ghastly sun worship practiced by the subjects of the Zipa and Zaque. He trained for twelve years in a special building, eating only a little maize once a day. "Perpetual penance seems to have been the first demand of the office," says Dr. KROEBER in the *Handbook of South American Indians* recently issued by the Smithsonian Institution.

There were many temples with crudely made idols, and also shrines to lakes, rivers, caves, and mountains. Lakes in particular were considered holy and were associated in some manner with snakes. Offerings often in-

cluded gold and emeralds, which especially aroused the interest of the Spanish conquerors. Human sacrifice was made primarily to the sun who, it was believed, ate people. To appease the angry sun in a time of drought, priests took a child to a mountain top that looked eastward, killed it before sunrise, and anointed east-facing rocks with the blood.

### *Architectural Historians*

The officers of the Society of Architectural Historians for 1952 are:

President: HENRY R. HITCHCOCK, Smith College, Northampton, Massachusetts

Vice-President: Mrs. JOHN M. GILCHRIST, Mt. Vernon, New York

Secretary: JOHN D. FORBES, Wabash College, Crawfordville, Indiana

Treasurer: BARBARA WRISTON, Museum of Fine Arts, Boston, Massachusetts

Also on the board of directors are three prominent in ARCHAEOLOGICAL INSTITUTE OF AMERICA activities: KENNETH J. CONANT, newly elected president, RICHARD H. HOWLAND, and CLARENCE WARD.

### *Northwest Stone Sculpture*

The Portland Art Museum assembled, and from March 11 to April 16, 1952, exhibited, a hundred and twenty extraordinary stone sculptures, of prehistoric Indian workmanship, from the Columbia River and Puget Sound—Fraser River basins, in the Pacific Northwest. As catalogue the Museum published a good-looking pamphlet which contains an essay on the sculptural style, by PAUL S. WINGERT of New York, and is illustrated with 42 half-tone engravings of the most distinctive pieces.

### *Lexington Society*

It appears likely that a new society of the ARCHAEOLOGICAL INSTITUTE OF AMERICA will be formally organized at a meeting to be held at Lexington, Kentucky, in the fall.

Kentuckians and other interested persons may learn the date of the meeting, and obtain other information, by writing or calling Professor JONAH W. D.

SKILES at the University of Kentucky, Lexington.

### *Taylor to Rome*

LILY ROSS TAYLOR, Professor of Latin and Dean of the Graduate School at Bryn Mawr College, has been appointed Professor-in-Charge of the School of Classical Studies at the American Academy in Rome, succeeding FRANK E. BROWN who goes to Yale in the fall.

LAWRENCE RICHARDSON, JR., has accepted the position of Field Archaeologist at the Academy, and will continue at Cosa, under the general supervision of Professor TAYLOR, the important excavations begun at this important site by Professor BROWN.

### *Cairo Center*

The director of the American Research Center in Egypt for 1952 is ARTHUR E. R. BOAK, professor of ancient history at the University of Michigan, Ann Arbor, who has been delivering the Jerome lectures at the American Academy in Rome. Professor BOAK reached Cairo on February 10.

### *Blegen to Pylos*

News from Athens includes the arresting item that Professor CARL W. BLEGEN of the University of Cincinnati, authority on the Greek bronze age and veteran of the excavation or reexcavation of a dozen prehistoric sites, including Mycenae and Troy, arrived in Athens on March 22 with plans to reopen the excavations of Pylos. There, on the eve of the war in 1939, he made the provocative find of six hundred clay tablets in a script similar to Minoan Linear Script B, dating from the late Helladic ("Mycenaean") period.

### *Historians of Art*

The seventeenth International Congress of the History of Art will take place from July 23 to 31, 1952, at Amsterdam. Afternoon excursions to Haarlem, Leiden, Utrecht, Delft, and Rotterdam will be organized, and on August 1 and 2, following the closing session of the Congress, members may join excursions to Maastricht and the

"Dead Cities of the Zuiderzee." The closing date for applications for space on the program was March 1; correspondence should be addressed to:

Professor M. D. OZINGA, Hon. Secretary,  
Art Institute of the University,  
Drift 25, Utrecht,  
Netherlands.

### *Books Wanted*

M. H. JAMESON, 211 Jesse Hall, University of Missouri, Columbia, Missouri, has asked help in locating two publications:

NILSSON, M. P., Griechische Feste von religiöser Bedeutung mit Ausschluss der Attischen (Teubner, Leipzig 1906).

DEUBNER, L., Attische Feste (Berlin 1932).

DIETRICH VON BOTHMER, Metropolitan Museum of Art, New York 28, New York, would like to obtain:

BEAZLEY, JOHN D., Attic Red-figured Vases in American Museums (Harvard University Press, Cambridge 1918).

### *AAA Officers*

For 1952 the elected officers of the American Anthropological Association are WENDELL C. BENNETT, President; FREDERICK EGGAN, President-Elect; W. A. LESSA, Secretary.

The 1952 meetings of the A. A. A. will be held at the University Museum, University of Pennsylvania, Philadelphia, Pennsylvania, from December 28 to 30. The chairman of the local committee is FROELICH G. RAINEY, Director of the University Museum; the chairman of the program committee is GORDON WILLEY.

The 1953 meetings will be held at the University of Arizona, Tucson, Arizona, from December 28 to 30.

### *Smithsonian Secretary*

The election of Dr. LEONARD CARMICHAEL as the new Secretary of the Smithsonian Institution of Washington, D. C., was announced by the Honorable FRED M. VINSON, Chief Justice of the United States and Chancellor of the Institution. Dr. CARMICHAEL, a nationally-known figure in education and

science, is now president of Tufts College in Medford and Boston, Massachusetts.

Dr. CARMICHAEL will become the seventh Secretary of the Smithsonian Institution when he takes over his new duties in January 1953. He succeeds Dr. ALEXANDER WETMORE, who reached the age of retirement in June 1951. Dr. WETMORE, a distinguished ornithologist, desires to give his full time to his scientific researches, but has consented to extend his term of service until his successor would be elected and assume the duties of the position.

### *Fulbrights*

Intending applicants are advised that for applications for Fulbright fellowships for 1953-54 the closing date is October 15, 1952. Address:

Conference Board of Associated Research Councils,  
Committee on International Exchange of Persons,  
2101 Constitution Avenue,  
Washington 25, D. C.

The October 15 closing date applies also to applications for Guggenheim fellowships.

### *Prix de Rome*

The trustees of the American Academy in Rome announced on March 10 the identity of the fellows appointed for the year beginning October 1, 1952. The fellows in classical studies—the academy grants no fellowships in archaeology as such—are:

ROBERT F. GOHEEN, Princeton University.

WENDELL V. CLAUSEN, Amherst College.

KENNETH S. FALK, Graduate School, Harvard University.

WILLIAM G. SINNIGEN, Graduate School, University of Michigan.

### *Guggenheim Grants*

Among the 191 fellowships awarded this year by the Guggenheim Foundation, seventeen were given for research in archaeology or in subjects connected with it. They are as follows:

JOSEPH BENJAMIN BIRDSALL, University of California, Los Angeles. Evolution in primitive human populations.

GIULIANO UGO BONFANTE, Prince-

ton University. Linguistic studies of hieroglyphic Hittite.

LIONEL CASSON, New York University. Maritime commerce in Greek and Roman times.

ALBRECHT GOETZE, Yale University. The Hittite language.

SOLOMON KATZ, University of Washington, Seattle. Bithynia as a client kingdom of the Roman Empire.

GEORGE ALEXANDER KUBLER, Yale University. Architecture of the Spanish and Portuguese empires.

PHYLLIS WILLIAMS LEHMANN, Smith College. Greek cult buildings of the Hellenistic Age.

FERDINAND DIEDERICH LESSING, University of California, Berkeley. Studies of the Ch'iang peoples of Southwest China.

JAMES A. NOTOPOULOS, Trinity College. Homeric poetry.

WALTER COLLINS O'KANE. Beliefs and views of the Hopi Indians.

BROOKS OTIS, Hobart College. Roman thought.

CARL ANGUS ROEBUCK, University of Chicago. Economic and social development of the Ionian Greeks.

RICHARD CASPER RUDOLPH, University of California, Los Angeles. History of Chinese archaeology.

ALEXANDER SPOEHR, Chicago Natural History Museum. Peoples and cultures of Micronesia.

ELIZABETH READ SUNDERLAND, Duke University. The Abbey of Charlieu in ancient Burgundy.

LILY ROSS TAYLOR, Bryn Mawr College. Roman politics in the last two centuries of the republic.

FRANCIS LEE UTLEY, Ohio State University. Apocryphal stories of the Flood, amplified from the Biblical text.

### *ACLS SCHOLARS*

The American Council of Learned Societies has announced a program of awards for individuals to be designated ACLS SCHOLARS for the academic year 1952-53. These will be chosen from among teachers in the humanities who have been temporarily displaced from college and university faculties as a result of the present emergency. Applications may be submitted by individuals, and academic institutions may also nominate candidates. In any case, the institution with which the candidate has been associated will be asked

by the ACLS for an expression of its concern and interest in his academic future. Application forms should be requested immediately from:

Secretary for ACLS SCHOLARS  
American Council of Learned Societies

1219 Sixteenth Street, N. W.  
Washington 6, D. C.

### *Archaeology in Denmark*

The University of Copenhagen and the University of Aarhus have organized a series of courses and seminars in English at the Danish Graduate School for Foreign Students, Copenhagen, September, 1952—April, 1953. The courses include: Nordic archaeology, by THERKEL MATHIASSEN of the National Museum, Copenhagen; Eskimo culture and language, by ERIK HOLTVED of the University of Copenhagen and HELGE LARSEN of the National Museum. Inquiries may be addressed to:

American Graduate School in Denmark  
588 Fifth Avenue  
New York 19, N. Y.

### *Inexpensive Classics*

The *Classical Weekly*, in its January 21 issue, presented a check list of recently published, inexpensive books useful for teaching the classics and ancient civilization. Besides many translations of ancient texts, there is a wide selection of volumes dealing with art and archaeology. This rather impressive list contains more than 200 titles, most of them costing less than one dollar. The issue of the *Classical Weekly* may be obtained for 30 cents from the Classical Association of the Atlantic States, Hunter College in the Bronx, 2900 Goulden Avenue, New York 68, N. Y.

### *Earliest Christian Records*

E. L. SUENIK, of the Hebrew University, Jerusalem, explored a family tomb near Jerusalem, which was in use from the first century B.C. to the middle of the first century A.D. The inscriptions and crosses found there he considers to be the earliest preserved records of Christianity, made within a decade or two of the Crucifixion.

Professor SUENIK's full account of

the discovery, his discussion of the interpretative problems, and his carefully weighed conclusions are presented in "The Earliest Records of Christianity." The non-specialist will gain from this study an insight into the methods of archaeological research, and will follow the archaeologist's reasoning as he proceeds from clue to clue to establish valid conclusions. This account is a special abstract from the AMERICAN JOURNAL OF ARCHAEOLOGY and may be ordered from the ARCHAEOLOGICAL INSTITUTE OF AMERICA, Andover Hall, Cambridge 38, Massachusetts, at the new low price of 50 cents.

### *Archaeology for Teen-Agers*

Ninth grade students of World History in the Baltimore Public Schools are rapidly becoming acquainted with modern methods of excavation. For over

twelve years classes in history have been going to the Walters Art Gallery for talks on Egypt, Mesopotamia, Greece, Rome, and other subjects related to their classroom work. Recently questions as to who found the objects, where and how they were dug up, and what brought them to Baltimore became so numerous that it was decided to place a new talk at the beginning of the series. This talk, entitled "Digging Up the Past," now gives every indication of outstripping in popularity even that old perennial "Egypt." Basically the new talk is an introduction to archaeological methods illustrated by slides and objects. Included in the discussion are the financing and forming of expeditions, choice of sites, plotting, mapping and digging techniques, and the distribution of objects found. Most gratifying to the members of the Education Department at the Gallery is the

fact that the children seem just as fascinated by the routine techniques of excavation and research as they do by the recounting of spectacular finds. Also of special interest is the path which information follows from mound to textbook.

### *About Faces*

A temporary exhibition for the late spring, May 3 to June 22, at the Walters Art Gallery, Baltimore, is called *Miniature Faces in Greek and Roman Art*. The objects, all from the Gallery's own collections, are coins, pottery, gems, and sculpture in bronze and terra cotta. No face over one inch tall is admitted. As a help in seeing the details of these tiny but exquisite carvings and drawings, greatly enlarged photographs of the same faces will be incorporated in the exhibition.

## BRIEF NOTICES OF RECENT BOOKS

**A History of Medicine. Volume I: Primitive and Archaic Medicine**, by HENRY E. SIGERIST. xxi, 564 pages, 100 figures, plates, 4 plans. Oxford University Press, New York 1951 \$8.50

This volume inaugurates the most ambitious project ever undertaken in the field of medical history. When completed, it will comprise eight volumes. Dr. SIGERIST, successor to KARL SUDHOFF as director of the Institut für Geschichte der Medizin at Leipzig in 1925, and successor to WILLIAM H. WELCH as director of the Institute of the History of Medicine at Johns Hopkins University in 1932, has been the leading historian of medicine for the past generation. In 1947 Yale University granted him a professorship with the title of Research Associate on indefinite leave of absence, and he has been able to devote his leisure time to this labor of love which has been close to his heart ever since his post at Leipzig. Volume I appears in Dr. SIGERIST's sixtieth year. Volume II will soon be

ready for publication and Volume III is well along in preparation. Scholars and scientists all over the world are wishing him the health and strength to complete his undertaking.

The present volume contains an elaborate discussion of problems and methodology and a thorough synthesis of the results of research on the medicine of primitive man, of ancient Egypt, and of Mesopotamia. Readers of ARCHAEOLOGY will be fascinated to learn how much paleopathologists have been able to ascertain about the diseases of early man from X-ray and microscopic examination of bones and teeth. Full documentation and extensive bibliographies and appendixes will make this volume the standard reference work on the subject for years to come.

WILLIAM B. STAHL  
*New York University*

**The Dome. A Study in the History of Ideas**, by E. BALDWIN SMITH. x, 164

pages, 228 figures. Princeton University Press, Princeton 1950 \$7.50

Mr. SMITH's point is that the dome is not, as generally thought, merely a functional means of vaulting which arose for environmental reasons, but a primitive form of roof, still found in the retarded cultures of Asia, Africa and the Americas, which early acquired religious sanctity and forever after played a major role in man's church architecture.

The author is interested not in the architectural history of the dome but in the history of the ideas that lead to its widespread use in religious buildings. The dome, he argues, was man's earliest and most prevalent form of roof. When made of some pliable material it offered the easiest way to cover a more or less circular tent or earth lodge or thatched cabin. The house with a dome came gradually to be a revered form and, built with more permanent materials, to be favored especially for tombs, houses of the

dead, as well as temples, houses of God. The religious associations of the dome came to be so strong that even after a culture developed other forms for their great temples, they clung to the use of the dome for their little shrines and tabernacles.

The dome, with its long traditional use in pagan tombs, was particularly appealing to the early Christians of Syria and Palestine who had a strong cult of the dead, especially the martyred dead. In those countries, where timber was readily available, wooden domes of imposing proportions were quickly and easily erected. And the domed structures of the Holy Land exercised a lasting influence on the architecture of Byzantium and Islam.

Mr. SMITH's account is supported by descriptions of dozens of domes and over 200 line drawings. The book itself is a splendid example of bookmaking, up to the Princeton University Press' accustomed high standard.

LIONEL CASSON

New York University

*A Study of Classic Maya Sculpture*, by Tatiana Proskouriakoff. xi, 209 pages, 111 figures (incl. 75 plates). Publication 593. Carnegie Institution of Washington, Washington, D. C. 1950 \$5.75.

This book is an admirable work both for its method and accomplishment. It presents a successful, if unusual, wedding of highly disciplined and meticulous archaeological craftsmanship with intelligent aesthetic conviction. To this reader it appears to be the first major contribution in a stylistic approach to Maya sculpture since SPINDEN's *Maya Art* of 1913, and provides a sound basis in method for further studies in this difficult area. But it is not, alas, for the layman or general historian of art; it requires that the reader be already "familiar with the basic structure of the Maya calendar." Limiting itself to monumental sculpture, particularly the stelae, it covers the Classical Period, or, from about 8.14.0.0.0 to 10.4.0.0.0, in other words, the interval from about 340-900 A.D. in the Christian calendar (these are almost the only dates which have been translated for us).

The most important proposal which

this study offers is a morphological-statistical tabulation of critical "traits," providing a very effective means for estimating the date of Maya monuments. The "traits" (no mere details) include such categories as the poses of the principal figure, as well as costume, accessories and ornament. The choice of categories is neither capricious nor fortuitous but the result of successive tests and eliminations. There remain only those "traits" which proved demonstrably reliable as significant indices of stylistic development when checked against stelae of known date. Carefully drawn charts show these separate "traits" and assign identifying numbers to each. There are also clear and simple graphs which plot time and frequency spans for their incidence. No single "trait" is accepted alone as a determinant factor but rather, a complex of some five or more are considered to comprise an acceptable basis for useful indications. The value of this system is clearly shown in another section of the book which deals with the general development of Maya style in terms of specific monuments. A number of controversial problems are convincingly resolved in the light of the new approach.

One can hardly doubt that the method, only barely outlined above, will impress the historian of art as fundamentally antithetical to sound stylistic conclusions. Mere perusal of the graphs and charts may suggest unimaginative statistical tabulation as their basis and invite unfavorable prejudice. But it is important to state that the author clearly and unmistakably rejects mechanical compilations, placing foremost more fundamental considerations of style and the whole work of art. Miss PROSKOURIAKOFF never forgets that "the most significant criteria of time" are the "purely artistic qualities" which belong "to the whole design and affect simultaneously all elements in it." Individual motifs are investigated because, "It is only by presenting the variations of a single element . . . that (the purely artistic qualities) can be described with any clarity." The study of individual motifs need not, after all, be reduced to meaningless compilations of disparate elements. Here, motifs are studied with appreciable sensitivity to their impor-

tance for style, and, contrary to pessimistic expectations, the method proves to be peculiarly appropriate to Maya sculpture.

The author is modest about her accomplishment and calls her methods "still primitive." Until the art historian is willing to enter the field and apply his more highly developed techniques of total-form-analysis, we can only sympathetically hope, with Miss PROSKOURIAKOFF, that her methods "can be improved and refined and that in time they will result in new insight into the intellectual aspects of Maya civilization."

HARRY BOBER

Harvard University

*The Architecture of Ancient Greece. An Account of Its Historic Development*, by WILLIAM BELL DINSMOOR. Revised and Enlarged Edition. Based on the First Part of *The Architecture of Greece and Rome*, by WILLIAM J. ANDERSON and R. PHENÉ SPIERS. xxiv, 424 pages, 125 figures in text, 71 plates, 2 maps, table. Batsford, London 1950 \$6.75.

ANDERSON-SPIERS-DINSMOOR, on whose 1927 edition a whole generation of historians of architecture has batten, is now available in an up-to-date revision, which incorporates both material which was arbitrarily excluded from the 1927 edition and the information which has been yielded by more recent publications and by new excavations such as those of the Agora, Eleusis, Olynthus, Troy, and Paestum. Here in one sturdy volume are a history of the recovery of Greek architecture, a comprehensive survey of the subject from Chapter 1, The Aegean Age, to Chapter 7, The Hellenistic and Graeco-Roman Phases, two hundred and sixty illustrations, line-cuts in the text and half-tone engravings on plates, a chronological table of temples with their approximate dates and principal dimensions and proportions, an appendix giving their measurements in the metric system, maps of Greece and Asia Minor and Italy, a bibliography ("Selected," but it runs to forty-five pages of small print), a glossary, and indices of places, persons, and subjects.

The author of the revision is pro-

fessor of archaeology in Columbia University, past president and now honorary president of the ARCHAEOLOGICAL INSTITUTE OF AMERICA, and the recipient of academic honors so many as to defy enumeration. He has devoted

a long and busy life to the close, detailed study of Greek architecture and chronological problems, and he speaks with conviction born of intimate and prolonged examination of the fallen blocks. Professor DINSMOOR is im-

patient of errors in detail, but he does not question the traditional appraisals of Greek architecture in the history of culture and you will not find him upsetting any important appraisals, at least not between these covers. I sup-

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pose it is all right to assert that "The sculptured enrichment of the Parthenon, designed by Phidias, was without doubt the most beautiful that the world has seen" (page 176), but he must be aware that some teachers permit, and some require, their students to entertain heterodox views.

Nor is this the place to look for a methodical enquiry into the Hellenic antecedents of the most important Roman building type, the basilica. It is quite impractical to say that "the Royal Stoa . . . was the forerunner of the Roman basilica, or court of justice" (page 206); the problem is far more vexing than this implies. Even this little cannot be regarded as proved; for one thing, the Royal Stoa at Athens has not certainly (*pace* Dr. THOMPSON) been identified, as Dr. DINSMOOR observes. There are those who challenge even the view (page 388) that the name of the basilica is derived from the Stoa Basileios. In the meantime, Dr. DINSMOOR is puzzled by the official name of the 'hypostyle hall' discovered long ago by the French at Delos; it is known as the Stoa of Posei-

don, "though its plan," he says, "bears no resemblance to that of a stoa" (page 294). On the contrary, there is evidence from Greek contexts that, in addition to colonnades, rectangular public buildings of a wide variety of sizes and purposes were known as stoas: arsenals, warehouses, salles hypostyles, and miscellaneous meeting places, as well as Roman basilicas and porticoes; the term means 'row of columns,' and can be applied appropriately to any building in which a row of columns occupies a prominent structural part, whether external or internal, or (as in the case of the Delos stoa) both. I am sure that the Pompeion at Athens, the Thersilion at Megalopolis, the Phokikon at Daulis, the Telesterion at Eleusis, and the Cabirion at Samothrace, as well as the hypostyle Stoa of Poseidon at Delos, were called stoas whenever it served the speaker's purpose. Once this state of affairs is understood, a Greek prototype for the basilica does not seem so inaccessible; a dozen possibilities are ready to hand.

This serves at once as a comprehensive textbook for school and college

courses and a compact handbook of the subject for ready reference. No library should be without it. In the present sorry state of Baedeker, it will also serve, as well as any, as a traveler's guide to the classical monuments of Greece. Between ANDERSON-SPIERS-DINSMOOR<sup>2</sup> and the 1945 edition of D. S. ROBERTSON, *Handbook of Greek and Roman Architecture*. Greek architecture is of all fields of art the one now best supplied with standard historical texts.

JOTHAM JOHNSON

*New York University*

Les voies romaines de l'Afrique du nord, by PIERRE SALAMA. 143 pages, 12 plates, map. Imprimerie officielle du gouvernement general de l'Algérie, Algiers 1951

The general reader will be interested by the discussion of the political, military, and economic background of Roman roadbuilding in general and specifically in Roman Africa, if he has learned to skip judiciously. He will perhaps be surprised to learn that the Romans varied the elaborateness of their

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roads very cleverly according to the configuration of the terrain and the quality of the soil. The author traces several roads, showing how they were planned by sections and the construction of each section suited to the conditions. The types of construction found in Africa are interestingly described and illustrated.

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RICHARD M. HAYWOOD  
*New York University*

*Aspects of the Principate of Tiberius*, by Michael Grant. 199 pages, 8 plates. The American Numismatic Society, 1950. (Numismatic Notes and Monographs, No. 116)

GRANT is a recognized scholar in the field of Roman numismatics. This study

is avowedly intended to be suggestive and exploratory rather than definitive or comprehensive. 153 coins which can be dated in the reign of Tiberius and which were issued at non-Spanish coloniae (not municipia) are studied. The Spanish issues constitute a larger and more specialized problem.

The very nature of the study pre-determines the fact that the conclusions and often the materials themselves are of a general and rather tenuous nature. Some very real and important trends can be noted, however. In the first chapter, "The Coins and the Colonies," which includes the catalogue of the coins and a discussion of the general aspects of the problem, it is pointed out that the coinage of the reign of Tiberius does not differ as radically and completely from that of the reign of Augustus as has been assumed.

Chapter II, "Tiberius as Princeps," examines the role of the emperor in imperial coinage, discussing the question from several aspects. The main discussion is rounded off in Chapter III, "The Family of Tiberius," with a discussion of coins issued in the names of

various members of the imperial family. In conclusion GRANT states that the coinage of the reign of Tiberius was in many ways "an aftermath of the principate of Augustus rather than a prelude to the principates which follow."

The variety of the material in the appendices can be judged from the titles: 1. Some non-Spanish colonial coins of uncertain princes, 2. The *municipia civium Romanorum*, 3. Spectrographic analyses, 4. Weights and denominations, 5. Colonial foundations and their coinages under Tiberius, 6. Local and imperial jubilees under Tiberius, 7. Some case-usages in ethnics, 8. The alleged suppression of "Altar" coinage in c. A.D. 21, 9. Non-imperial Roman at peregrine cities under Tiberius (a very interesting section), 10. The eastern command of Germanicus, 11. The Augustan origins of the auspices of Tiberius, 12. The Augustan origins of the Victory of Tiberius.

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